

# Parlor vs. milking efficiency, faster isn't always better

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## Abstract

Our clients are always striving to increase milk production while maintaining cow comfort and efficiency. As veterinarians and scientists, we can help them do that, however, there are many variables that go into increasing productivity on a dairy farm. Efficiency in the parlor is one aspect, but we can further break that down to milking efficiency on the cow level. More goes into milking cows quickly than rushing them through the parlor. While it may seem counter-intuitive, slowing down and properly stimulating cows for at least 10 seconds of combined time and wiping and drying during the pre-milking routine, will help ensure adequate oxytocin release and milk let down. Bimodal milk let down is costing our clients money and time.

**Key words:** efficiency, bimodal, overmilking

## Parlor efficiency

How do you define parlor efficiency? There's not really one definition, and we can quantify it in a variety of ways. Depending on the outcomes that you want to monitor, we can look at it from different angles. But as veterinary practitioners, I always say that we are the advocate for the cow, and you must ask yourself, is what the employees are doing what's best for the herd? Some definitions of parlor efficiency people may come up with include average pounds milk produced per hour, number of cows milked per employee per hour, number of parlor turns per hour, or the parlor being on time (or not behind schedule).

How does a parlor stay running on time? Usually it's one of two scenarios, either 1) cows are milking very quickly, or 2) employees are rushing. Which type of herd are you working with?

Next time you're at herd check or cleaning up, take a few minutes to look around and spend some time watching cows during milking and see what you can notice. Are cows moving into the parlor calmly with minimal contact, or is there a lot of noise? As cows are leaving the parlor, do they look well post-dipped? Do the cows look milked out?

## Milking efficiency

Just like parlor efficiency, there are many ways to define milking efficiency. This may vary for each client. How would you define milking efficiency? Some common examples are:

### 1. Average pounds of milk produced per cow

This can be an important number, one that most producers know. But let's think about it. What's an average? It's a number expressing the central or typical value in a set of data. While people may think that it gives them a good view of what's going on, there are also downsides.

- Masks highs and lows in a data set
- Could be the average of 2 or 2,000 animals
- Maintaining an "A+" average can be doctored

- Ex. Bulk tank somatic cell counts can be lowered, and it doesn't always reflect the amount of mastitis on a farm. Averages can be decreased by treating cows/moving to hospital pen, selling cows, drying off quarters, bucket milking cows.

### 2. Percentage of bimodal milk let downs

What should typically occur when a cow enters the parlor for milking, is that teat stimulation will send a neural response to the hypothalamus which will then send a signal to the pituitary gland to release oxytocin back into the bloodstream. Oxytocin will then make its way back to the mammary gland. Oxytocin will activate the myoepithelial muscles around the alveolar glands in the mammary tissue which will squeeze milk into the mammary gland's duct system, finally collecting in the teat cisterns to be harvested. From stimulation to milk let down, the neuroendocrine process takes approximately 1-2 minutes. A bimodal, or biphasic, milking event depends on how well cows are being stimulated prior to milking unit attachment. When inadequate oxytocin release, often we'll see an ejection of the cisternal milk and milk will be observed in the unit for a short period of time before it stops. At that time, we're not collecting any glandular milk, which makes up approximately 80% of the available product a cow has for harvest. What we see cow side during this time, is after a milking unit is attached, milk may appear in the unit cluster, but quickly stops, and it takes around 30-60 seconds for milk let down to restart. We know this is a problem, but how do we know what's normal? How much biphasic milking should occur? Based on a past study done in Michigan dairy herds, we found that herds had a bimodal milk let down percentage that ranged from <5% to 75% of milking events.<sup>2</sup> A good goal for your extra credit clients would be 5% or less.

Bimodal milk ejection is an issue in the milking parlor that affects cow comfort, but does it affect milk yield? Furthermore, what does that mean for your client's production? To answer this question, a study was done by Erskine et al on a Michigan farm with 3,200 milking animals that were milked 3X a day. Using the VaDia<sup>6</sup>, one milking event was recorded per cow, and any cows that met the following criteria were excluded from the trial: a) cows that were treated or currently had clinical mastitis, b) 3-quartered cows, c) if cows kicked off milking clusters, or they fell off.

Recordings were taken over the course of 10 days and then were graphed with percent of bimodal milkings vs. milk yield. The statistical analysis showed that a 30-second delay in milk let down after the milking unit was attached was associated with an average of 3 lbs (1.4 kgs) decrease in milk production compared to their herdmates, per milking. If there was a 60-second or more delay, a 7 lb (3.2 kgs) average decrease was observed compared to their herdmates, per milking.<sup>1</sup> In other words, every cow who consistently had bimodal milking event, could be losing out on up to 21 lbs (9.5 kgs) of production per day.

### 3. Overmilking

Overmilking time can also be used as an indicator of a cow's milking experience.

Overmilking causes increased exposure to vacuum and results in teat congestion, pain and hyperkeratosis of the teat ends, predisposing cows to higher risk of mastitis. Overmilking can occur for several reasons, but most commonly include if there are no automatic take-offs on the milking units or if the take-off settings are set too dry. Other factors that are more employee-oriented include if they set take-offs to manual or if units are re-attached after milking completes. Overmilking can be monitored using a few different methods. You can use diagnostic equipment, such as the VaDia or TriScan<sup>7</sup> which will graph out a cow's milk flow. Another option is doing a strip yield test. This is an easy way you can test overmilking cow side with little to no equipment. For a description, see link below.<sup>4</sup> A goal for your best clients would be less than 30 seconds of overmilking time.

### 4. Unit on times

What about unit on times? Shouldn't those be an indicator of how well a cow is milking? To answer this question, we once again look at the previous study done on the same 3,200-cow milking herd. When all the milking events were plotted out with milking time vs. when the VaDia said that cow had milk flow, there were some trends in the data. There was the group of cows that had milk flow right when the unit went on. However, we didn't see an association of when there was a bimodal milking event and that cow's milking time. The average unit on-time didn't increase. So, while monitoring unit on times are a good piece of information to have, they are not indicative of a bimodal milking event occurring.

## Effect of parlor efficiency on milking efficiency

Running a parlor efficiently while achieving maximum milking potential is a balancing act that our clients are trying to accomplish daily. So, the question is, who's best to evaluate the happenings of the parlor? I think the obvious answer should be the cow. By being able to monitor cow behavior coming into the parlor, during milking, then as she's leaving, in conjunction with the production numbers, we should be able to clue in on how she feels about the parlor's routine.

How do we milk a cow efficiently? We want to maximize cow comfort in the parlor to help facilitate oxytocin release and complete milk let down and harvest to increase farm production as much as possible. It doesn't make sense that our clients are investing in better genetics, including milking potential, but then not allowing these animals to perform to the best of their ability. A cow's milking potential may be 100 lbs of milk a day, however, if we're inhibiting oxytocin release by not giving her enough stimulation time, creating a loud, stressful milking environment, or causing teat congestion and not allowing milk to be harvested, we're putting her at a disadvantage from the start. Emphasis should be placed on protocols to decrease stress and epinephrine release, which can inhibit oxytocin release, to further decrease time in the parlor, milking unit on-time, and risk of mastitis.

We also cannot forget about the employees who are milking the cows day in and out.

Rushing cows through the parlor isn't just stressful on them, but on the employees as well. If workers are worried about getting cows through the parlor as quickly as possible, they're not able to focus on moving the cows into the parlor gently and quietly. Furthermore, they often start rushing through the pre-milking preparatory routine so that they can get units on as soon as possible. What they often don't realize is that the stimulation that comes from cleaning and drying teats as well as proper lag time is essential for milk let down. We often see this battle in the parlor with cows kicking units off and dancing around due to discomfort from milking units, having to re-attach units, or place them on manual settings. This further increases the risk of teat injury, overmilking and mastitis. We need to educate milkers that taking time to properly prep cows before the unit goes on, will set them up for success, and lead to cows milking out faster and more efficiently.

In summary, we need to consider more factors than just the number of cows we can push through a parlor in a given time period. Instead of focusing on the number of cows that can be milked, we should focus on how well can we milk a smaller number of cows? Second, how farms measure their milking efficiency can be variable, but picking something that's measurable and able to be recorded is important. The third point is that decreased milking efficiency is leaving money behind, especially as it relates to bimodal milk let down. If we can decrease the number of animals we have on a farm, but not lose out on the amount of milk our clients are making, the benefits will start to compound. Fewer animals to milk leads to decreased stocking density in housing areas, less feed needed and potentially healthier animals and bigger profits for the farm.

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