

Increasing automatic milking system performance with milking management practices

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Summary:

- Teatcup removal settings can help reduce milking time by variable amounts. The removal criteria used depends on the manufacturer.
- Milking permission can be modified according to stage of lactation.
- Focus milking permission on more efficient cows.

Introduction

In automatic milking systems (AMS), it is important to maximize the amount of milk harvested per robot per day to increase profitability. One strategy to increase milk harvested per AMS is increasing milking capacity, which is the number of milkings performed by the robot in a day. Maximizing milking capacity can be achieved by managing incentives (mainly feed) to achieve a constant flow of cows arriving at the milking shed to be milked or by reducing the time it takes for each milking to be performed. Research has identified two of the most important factors driving milk production per robot per year: (1) average milk flowrate during a single milking; and (2) the number of cows milked in the robotic unit. Therefore, fast milking cows increase milk production per robot per year.

One strategy explored for reducing milking time has been to modify the teatcup removal setting so that teatcups are removed earlier. A common concern is the impact this practice might have on milk production and udder health. This practice has been applied in conventional milking systems with a successful reduction in milking time without a negative impact on milk production or somatic cell counts (SCC).

Teatcup removal settings in AMS

Depending on the brand of the AMS, different strategies exist for adjusting the teatcup removal setting. The impact of this practice will depend upon the criterion for teatcup removal. Usually, teatcup removal occurs when the quarter milk flowrate is below a certain value.

At the Teagasc robotic milking facility, an experiment was carried out to compare the impact of three teatcup removal settings relative to the average milk flowrate of the quarter (Table 1) on box time (i.e. time that the cows are inside the robot), milking time, milk production and somatic cell counts.

Table 1. Teatcup removal decision: quarter flowrate below a percentage of the quarter average milk flowrate

	Teatcup removal setting		
	Early	Normal (default)	Delayed
Percentage of quarter average milk flowrate	50%	30%	20%

Normal and early removal strategies had similar milking times and box times, and both were on average 9 to 10 seconds shorter than delayed removal strategies. Over a full day, this time saving could allow for more than three extra milkings per day or one extra cow in the system. No negative impact of the teatcup removal setting was found on milk production per milking or somatic cell count (Table 2).

Table 2. Impact of three percentage based teatcup removal settings on milk production, box time, milking time and somatic cell count

	Teatcup removal setting		
	Early	Normal	Delayed
Milk production/milking (kg)	11.7	11.9	11.9
Box time (s)	420	418	429
Milking time (s)	342	341	350
SCC (n)	32,359	31,622	35,481

In a study using an indoor AMS, mid-lactation dairy cows had a reduction in milking time of 0.9 minutes when using a teatcup removal setting of 0.48 kg/min compared to 0.06 kg/min, with no negative impact on milk production or SCC. An absolute milk flowrate removal setting might be more effective in reducing milking time.

Other management strategies

Research has shown that increasing the milking permission from 8 to 10 hrs in mid lactation cows (175 days in milk) had no impact on milk production. Additionally, paying attention to “efficient” cows (few incomplete milkings, high milk flowrate, shorter box times, good milk production, etc.) and allowing this sub-group of cows greater access to the AMS could increase milk output from the AMS.

Conclusions

Modifying teatcup removal settings to the specified parameters can provide reductions in milking time, increasing robot efficiency. Other practices can include differential milking permission according to stage of lactation and prioritizing milking of more efficient cows.

