A Case Study with Whispering Grass Dairy on Milking a Grass-fed Dairy Herd Once-A-Day

Introduction

As farmers continue to find ways to adapt to milk and labor market conditions, adopting alternative production strategies, such as once-a-day (OAD) milking, is becoming increasingly appealing. However, while reducing milking frequency can reduce labor needs surrounding milking tasks, milk production can be significantly reduced. In a grass-fed herd, milk production is already lower than other pasture-based (i.e., organic) systems and therefore may present an opportunity to minimize production reductions in response to OAD milking. To examine this scenario, data were collected from a certified grass-fed dairy farm in New York that switched from twice-a-day (TAD) milking to OAD for several months. This report will summarize the findings of that case study.

Materials and Methods

Whispering Grass Dairy is a certified organic grass-fed dairy farm located in Fort Plain, NY. This dairy farm has been certified grass-fed for approximately 5 years. The herd is composed of approximately 40 crossbred dairy cattle and calves year-round but slightly more heavily in the fall to take advantage of higher milk prices during the winter months. The average daily milk production for the herd with TAD milking was 30.7 lbs/cow which is similar to the 30.5 lbs/cow national average for grass-fed dairy (Snider et al., 2019).

Whispering Grass Dairy's grass-fed cows grazing perennial pasture.

Milk production and herd data from the Dairy Herd Improvement Association were collected monthly from June 2018-March 2022. Monthly data were collected on the 17th of the month +/-3 days. Data were collected on individual cows in the herd and were averaged across the entire herd monthly.

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Results

The farm switched to OAD in November 2021. The initial change in production between October and November averaged -10.0 lbs/cow/day, a decrease of 27.2% (Figure 1). Over the next couple of months, production continued to decrease an additional -1.0 lbs/cow/day (4.4%) followed by an -2.5 lbs/cow/day (11.8%). This brought average daily production down to an all-time low on the farm of 21.6 lbs/cow/day. At this point, the farmer did not believe that the economics of this trajectory would be sustainable, and he did not want to continue to lose productivity or risk other potentially long-term impacts to his animals. In February 2022, he switched back to TAD. Upon switching back to TAD, his milk production increased by 3.1 lbs/cow/day or 13.3% in the first month. Production continued to rise the following month by an additional 1.1 lbs/cow/day or 9.7%. Overall looking at the long-term average and OAD trial period production average, milk production decreased from 30.6 to 23.3 lbs/cow/day which equates to a 23.9% reduction. The most significant reduction was experienced during the first month of the transition as shown in Figure 1.

Figure 1. Milk production and monthly change under OAD milking.

However, it is also important to consider the stage of lactation of the herd during the transition and trial period. Days in milk (DIM) collected on test day was used to categorize the herd by stage of lactation. In comparing the long-term TAD average milk production and quality per cow to their averages under OAD, we see the highest reductions in milk production in fresh cows (Table 1). Fresh and early lactation cows also experienced the highest increases in somatic cell counts (SCC) and fat content.

At the time the switch was made, approximately 41% of the herd was <90 DIM with an additional 22% in early lactation. Had the switch occurred at a time when less of the herd was fresh, the change in production and SCC may not have been as significant. In addition, the timing of switching to OAD milking also coincided with the transition off pasture. This change in ration composition and quality, especially given the proportion of fresh and early lactation cows in the herd, may also have impacted the changes observed.

Table 1. Change in production and quality over trial period by stage of lactation.

Lactation stage	Milk production	Fat content	Protein content	Somatic Cell Count (SCC)
	Percent change from TAD (%)			
Fresh (<90 DIM)	-24.5	13.8	-2.04	30.0
Early (91-150 DIM)	-17.9	12.9	8.91	61.2
Mid (151-250 DIM)	-19.9	4.88	10.8	27.8
Late (>250 DIM)	-2.99	8.75	9.97	-0.33
Herd average	-23.9	13.9	10.1	33.1

Results

While these trends were experienced across the herd, there were dramatic differences between individual animals' responses to the changes in milking schedule. For a farmer to transition the herd successfully from TAD to OAD milking, the cows would ideally be able to produce similar quantities and qualities of milk under both scenarios. By plotting each cow's average daily milk production level under OAD milking versus TAD, you can visually identify cows that have high productivity under both schedules (Figure 2). These cows will appear close to or on the dotted line. Cows that land on the dotted line produced the same amount of milk under both schedules. Cows that are above the line produced more under OAD while cows under the line produced more under TAD. As expected, most cows fall below the line, however, there are quite a few that are fall on or very near the line. This indicates that there are cows in the herd that can maintain their level of productivity despite reducing milking frequency to OAD. The cluster of cows circled in red is particularly promising as these cows experienced little deviation from their TAD production levels which remained >30 lbs/day.

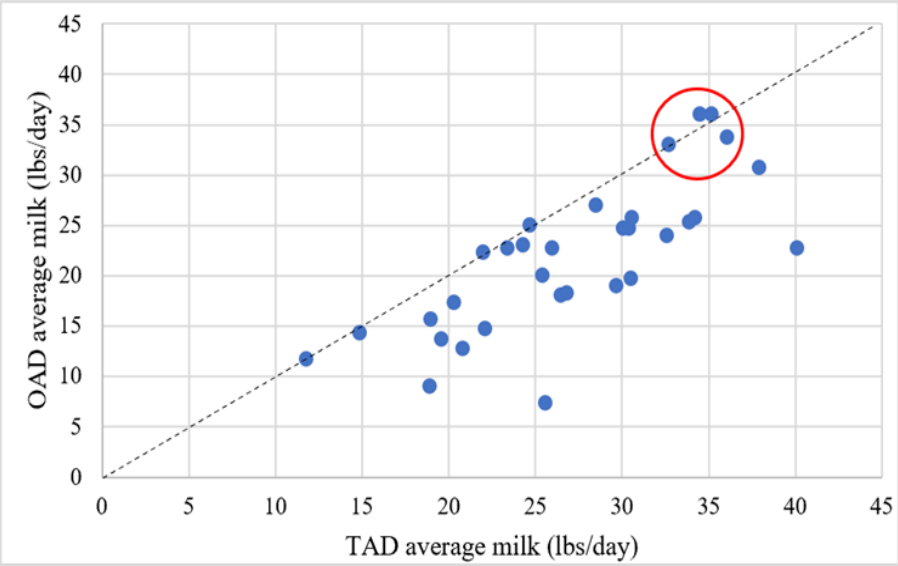


Figure 2. Average milk production per cow under TAD and OAD management.

In addition to milk production, changes in SCC can be problematic under OAD milking. Overall, the herd averaged an increase in SCC by 33.1%. However, differences between individual cow SCC responses were observed (Figure 3). Interestingly, 56.3% of the herd averaged below 200,000 SCC under both TAD and OAD scenarios. Producing milk at or below this SCC cutoff would provide the farm additional income due to capturing quality premiums.

Within this group of cows, 25% experienced reductions in SCC while 31.3% experienced increases but remained below the 200,000-count threshold. Another 6.3% of the herd were above the 200,000 threshold under TAD but decreased below the threshold under OAD management.

Unfortunately, 34.4% of the herd experienced SCC >200,000 under both milking scenarios and 3% increased to over 200,000 under OAD. These data suggest that not all cows experience the same impacts on SCC from altering milking frequency. Targeting the cows that remained below the target threshold for selection will help maintain success under OAD milking.

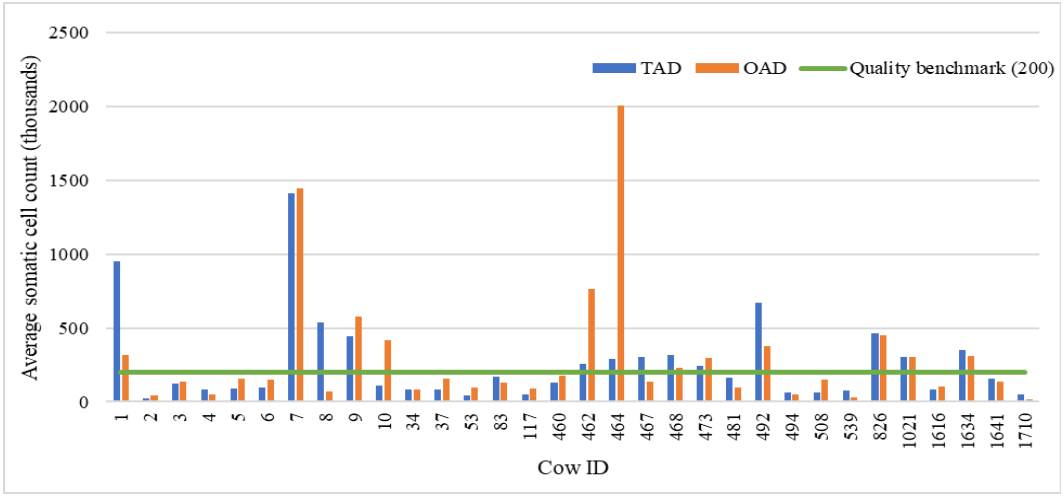
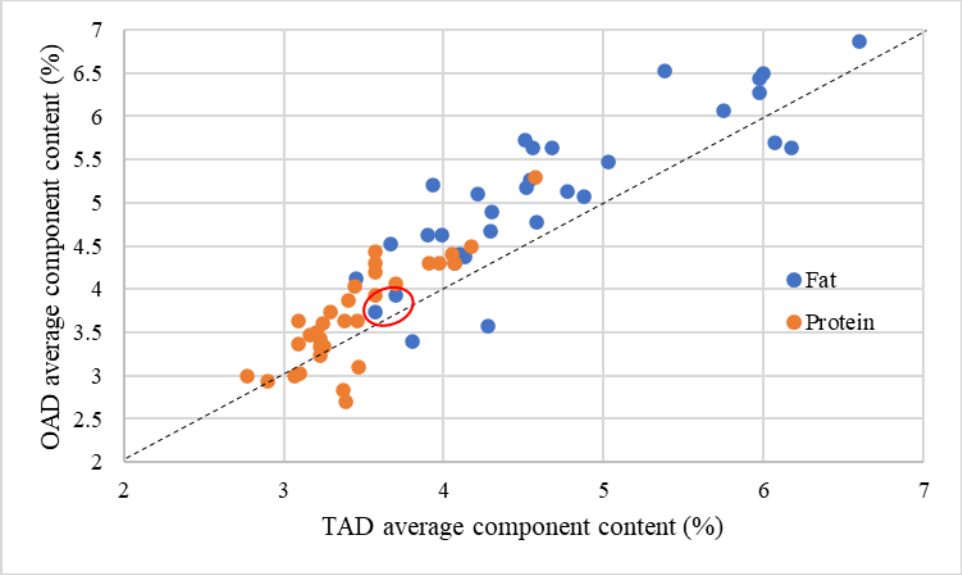


Figure 3. Individual cow average SCC under TAD and OAD management.

Since price premiums are paid for fat and protein, changes in milk components must be considered to determine the full economic impact of a milking frequency change. Overall, both fat and protein concentration increased under OAD milking by 13.8 and 10.1% respectively. However, individual cows varied in their responses (Figure 4).



Cows that fall above the dotted line increased in fat (blue dots) and protein (orange dots) under OAD milking. While most cows increased in fat and protein under OAD milking, several decreased. In addition to the change in components, the overall fat and protein level must be considered. For example, while the cows circled in red maintained fat and protein levels under OAD similar to their TAD levels, overall content in both cases was quite low and would not gain substantial price premiums.

Figure 4. Average fat and protein content per cow under TAD and OAD management.

In addition to changes in milk production and components, we must also consider differences in labor needs and timing. Reducing milking frequency by 50% can mean a significant reduction in paid labor and can free up labor to complete other tasks on the farm. However, on a farm relying solely on unpaid/family labor, these benefits can be more challenging to quantify. Furthermore, labor savings and efficiencies gained from shifts in labor due to the OAD schedule need to equal or exceed the loss in milk income to allow the farm to cash flow. In this case, after the two-month trial period the income losses were too substantial to be sustainable long term and the benefits in labor flexibility were not sufficient to outweigh this loss.

Conclusions

This case study provides insight into milk production and component changes that may be expected under OAD milking and potential for identifying animals that demonstrate potential to perform adequately under such a transition. While these changes may not be experienced to the same degree on all farms, the same factors would need to be evaluated in any operation considering OAD milking.

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