



Nutritional management strategies for SK and MB farms with Automatic milking systems

Julianne Lavoie, R. Matson, T.J. DeVries and G.B. Penner

**Dairy Info Day
January 22nd, 2020**



Background

- Concentrates are provided in the AMS to help attract the cows
- Debate regarding the quantity of concentrate that should be provided in the AMS
- Previous studies have looked at the quantity of the pellets provided on a farm level but not on an individual cow basis
- These studies did not include any information regarding the partial mixed ration (PMR)





The study

- Part of a larger study looking at optimizing robotic milking systems by benchmarking housing, feeding and management systems across Canadian farms with automatic milking systems (AMS)
 - My part of the project focuses only on the nutritional management strategies implemented in SK and MB farms
 - Conducted in-person farm surveys to 22 farms during summer of 2019



Objectives of the study

- Identify feeding practices in relation to days in milk and milk yield
 - Quantity of concentrates delivered in the AMS
 - Milking duration, milk yield
 - PMR and AMS concentrate ingredient composition, and chemical composition
- Create benchmarks of the common practices and associated with milk yield, milk components and milking frequency



Who participated

Dairy producers with AMS and enrolled in DHI were invited to participate in the study

- 3 additional non-DHI farms were recruited

Table 1. Breakdown of farms enrolled in the study per province. Number of farms registered with DHI.

Item	Province		
	SK	MB	Total
(n) farms enrolled	12	10	22
(n) DHI-farms	9	10	19
(n) non-DHI farms	3	0	3

Table 2. Type of AMS and traffic flow system per province

Type of AMS	SK	MB
DeLaval (n) per prov.	3	4
Lely (n) per prov.	9	6
Traffic flow system		
Free-flow	12	7
Feed-first	0	0
Milk-first	0	2
Other ¹	0	1

¹ Farm with two barns, one free flow and the other feed first

Table 3. Number of AMS and cows per farm in SK compared to MB.

	Mean	Min	Max
(n) AMS/farm			
SK	2.1	1.0	4.0
MB	4.4	1.0	17.0
(n) cows/farm			
SK	105.9	45.0	215.0
MB	236.1	56.0	1000.0
(n) cows/AMS			
SK	52.3	45.0	60.0
MB	52.6	45.0	58.8

The farm visits

- Survey with questions on farm info, housing, feeding and management practices
- PMR and AMS pellets sample collections
- 7 months of individual feeding and milking records were collected from the AMS system
- DHI records for the last year
- Consent to contact nutritionist to get additional information on the ration

Data summary

- Feeding and milking data collected was summarized per cow then by farm into days in milk and milk yield categories

Lactation category	Days in milk
Early	1 - 45
Peak	46 - 99
Mid	100 - 199
Late	200 - 305
Over	> 305
Milk yield category	Milk yield (kg/d)
Low	≤ 30
Medium	$> 30 < 50$
High	≥ 50

Survey Answers: AMS feeding practices

Table 5. Answers to survey question regarding AMS feeding practices

What form are the AMS concentrates provided?	(n) producers	(%) producers
Pellets	16	72.7
Pellets and ground corn	2	9.1
Pellets and steam rolled corn	3	13.6
Steam rolled corn and roasted soybeans	1	4.5
How do you feed concentrates?		
Feed table	22	100
Flat rate	0	0

Milking frequency and yield results

Table 6. Milking frequency and milk yield results for obtained from AMS and sorted by days in milk category

(n) milkings/d	Early 1-45 DIM	Peak 46-99 DIM	Mid 100-199 DIM	Late 200-305 DIM	Over >305 DIM
Mean	3.09	3.22	3.10	2.83	2.52
Maximum	3.89	3.85	3.75	3.41	3.05
Minimum	2.49	2.67	2.59	2.44	2.07
StdDev	0.38	0.31	0.30	0.25	0.31
Milk yield (kg/d)					
Mean	39.0	44.1	40.8	35.3	30.2
Maximum	53.5	55.8	49.4	43.1	36.9
Minimum	33.0	30.0	33.5	28.9	23.6
StdDev	4.6	5.5	4.0	2.8	4.1

¹ 1 – 45 days in milk

² 45 – 99 days in milk

³ 100 – 199 days in milk

⁴ 200 – 305 days in milk

AMS concentrate delivery results

Table 7. Feeding quantities delivered per day and per visit in AMS per day sorted by milk yield category

Concentrates delivered (kg/d DM)	Early 1-45 DIM	Peak 46-99 DIM	Mid 100-199 DIM	Late 200-305 DIM	Over >305 DIM
Mean	5.06	5.86	5.35	4.59	3.73
Maximum	7.28	8.81	7.65	6.14	5.62
Minimum	3.47	2.93	2.27	1.44	1.12
StdDev	0.78	1.13	1.07	1.09	1.28
Concentrates delivered (kg/visit DM)					
Mean	1.68	1.86	1.76	1.63	1.44
Maximum	2.22	2.47	2.33	2.18	2.26
Minimum	1.04	0.91	0.79	0.57	0.50
StdDev	0.30	0.35	0.36	0.38	0.43

Table 8. Feeding quantities delivered per day and per visit in AMS per day sorted by days in milk category

Concentrates delivered (kg/d as fed)	Low <30 kg/d	Medium 30-50 kg	High >50 kg
Mean	3.44	5.34	7.01
Maximum	4.51	8.56	12.78
Minimum	1.62	2.33	4.07
StdDev	0.69	1.18	1.67
Concentrates delivered (kg/visit as fed)			
Mean	1.54	1.73	1.88
Maximum	1.99	2.48	2.68
Minimum	0.59	0.78	1.20
StdDev	0.35	0.37	0.33

In the works

- Summary of PMR and AMS feed composition and chemical composition
 - Nutritional analysis is still being obtained and compiled from the various farm's nutritionists

Conclusion

- Common practice to feed pellets in the AMS and setting amounts with a feed table
- Average quantity across all stages of lactation was between 3.73 – 5.86
 - Range is more moderate than observed in US surveys (Salfer and Endres, 2018)
- Results from this study form a summary of the practices being implemented in SK and MB farms and serve as benchmarks for further studies

Acknowledgments

- Funding from Dairy Farmers of Canada
- Support and data form Lactanet
- Producers involved in the study
- Nutritionists providing additional ration information