MILK PARAMETERS DURING LACTATION ON FARMS WITH AUTOMATIC AND CONVENTIONAL MILKING SYSTEM

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INTRODUCTION

The popularity of automatic milking systems is increasing among Estonian dairy farmers and thus 184 robot units have been installed on 46 farms as of January 2013.

OBJECTIVE

The objective of this study was to compare milk parameters during lactation months (LM) on farms with automatic (AMS) and conventional milking system (CMS).

MATERIAL & METHODS

- 345,664 test-day milking records,
- 51,276 cows,
- 102 enterprises,
- January to December 2012,
- data from Estonian Animal Recording Centre.

Measured monthly:
- milk yield (MY),
- fat (MF) content,
- protein (MP) content,
- somatic cell score (SCS).

AMS (34 cowsheds):
- DeLaval VMS 20,
- Lely Astronaut 11,
- Insentec Galaxy-Starline 3.

CMS (100 cowsheds):
- 2x milking 81,
- 3x milking 19.

The GLM model (SAS 9.1):

$$Y_{ijklm} = \mu + MS_i + P_j + CM_k + F_l + \varepsilon_{ijklm}$$

- Y – dependent variable;
- μ – model intercept;
- MS_i – milking system;
- P_j – parity;
- CM_k – calving month;
- F_l – farm;
- ε_{ijklm} – random error.

RESULTS

- The highest MY (30.1 kg) was on 3x CMS farms, whereas cows on 2x CMS farms produced 7.7 kg less milk.
- The MY in AMS was between 2x and 3x CMS values.
- Cows on DeLaval AMS farms had 1.5 kg higher MY than cows on Lely AMS farms (Table).
- MY increased until the second month of lactation on all CMS and AMS farms and subsequently decreased.

Table. Least square means of milk production and quality traits (± standard error)

Milking system		Cows	Milking's	Milk, kg	Fat, %	Protein, %	SCS
AMS	DeLaval	4,553	34,102	26.3±0.40	4.39±0.028	3.61±0.012	2.88±0.073
	Galaxy	734	5,533	25.5±0.44	4.24±0.033	3.53±0.014	3.66±0.086
	Lely	3,000	21,798	24.8±0.41	4.42±0.028	3.63±0.013	3.49±0.074
CMS	2x milking	31,614	211,568	22.4±0.39	4.46±0.026	3.61±0.012	3.81±0.068
	3x milking	11,375	72,663	30.1±0.40	4.17±0.027	3.45±0.012	3.33±0.070
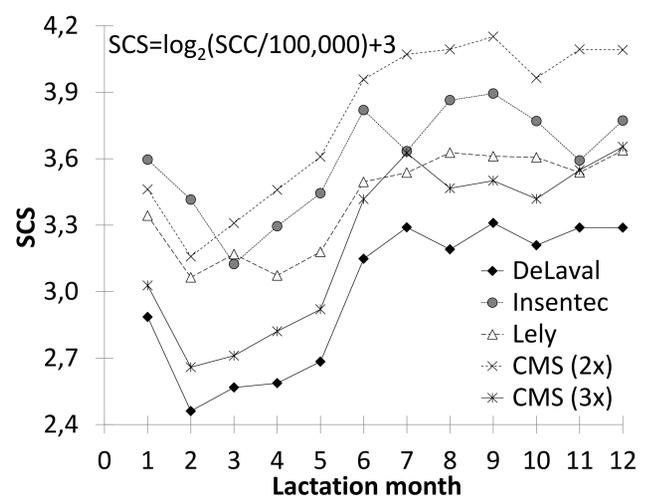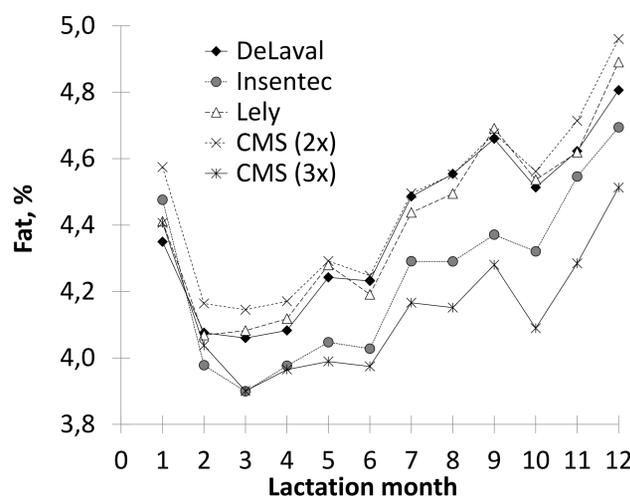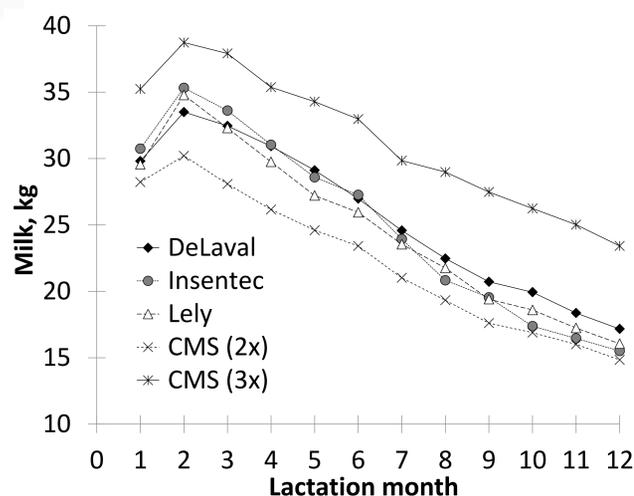
Figures. Monthly least square means of milk parameters adjusted for breed, parity, calving month and farm effect

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- Higher MY resulted lower MF (r = –0.36) and MP (r = –0.42) content.
- After 2nd LM, MF was considerably lower on 3x CMS and Insentec AMS farms.
- MP contents were similar among MS farms.
- The highest SCS (3.81) was found in milk obtained from 2x CMS.
- Increased milking frequency decreased SCS by 0.48 on CMS farms.
- Milk SCS was lowest (2.88) in cows milked with DeLaval AMS, and highest on Insentec (3.66) AMS farms.
- SCS decreased during the first two LMs, showed modest increase until the 5th LM, then increased considerably and remained rather stable in all MSs.

CONCLUSIONS

- Increasing milking frequency (2x to 3x) will increase the MY.
- Frequent milking (2x vs 3x) caused lower SCS on CMS farms.
- Higher MY decreased MF and MP content.
- AMSs showed similar trends to those in CMSs.
- Decrease in MY was linear during lactation months.
- Irregular milking on AMS farms did not caused higher SCS, compared to CMS.
- At 6th LM, SCS increased considerably on all MSs.

ABBREVIATIONS

AMS – automatic milking system,
CMS – conventional milking system,
SCS – somatic cell score,
MY – milk yield,
MF – milk fat,
MP – milk protein,
LM – lactation month.

DeLaval VMS

Lely Astronaut

Insentec Galaxy-Starline

Milking parlour

Eesti Maaülikool
Estonian University of Life Sciences