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Milk parameters during lactation on farms with automatic and conventional milking system

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The objective of this study was to compare milk parameters during lactation months (LM) on farms with automatic and conventional milking system (CMS) as of January 2013, 184 automatic milking systems (AMS) have been installed on 46 farms in Estonia.

A total of 345,664 test-day milking records of 51,276 cows from 102 enterprises for January to December 2012 were obtained from the Estonian Animal Recording Centre. The variables measured monthly were: milk yield (MY), fat (MF) and protein (MP) content, somatic cells score (SCS). AMS was used on 34 cowsheds (DeLaval VMS 20, Lely Astronaut 11, Insentec Galaxy-Starline 3), and CMS on 100 cowsheds (2× milking 81, 3× milking 19). The GLM considering the fixed effects of the milking system (MS), breed, parity, calving month, and random effect of farm, was fitted for each LM and variable (SAS 9.1).

The highest MY per cow (30.1 kg) was obtained on 3× CMS farms, whereas cows on 2× CMS farms produced 7.7 kg less milk. As AMS milking frequency according to literature varies 2–2.5×, the MY in AMS (24.8–26.3 kg) was similar to that in CMS. Cows on DeLaval AMS farms had 1.5 kg higher MY than cows on Lely AMS farms (24.8 kg). MY increased until the second month of lactation on all MS farms and subsequently decreased. MY difference between 2× and 3× CMS increased until the 3rd LM, being 8.8–9.5 kg higher in 3× CMS until the 9th LM, and subsequently decreased (8.6–9.4 kg). All AMS farms showed more equal results, whereas MY after the 5th LM became similar to the MY obtained on 2× CMS farms. Higher MY resulted in lower MF ($r=-0.36$) and MP ($r=-0.42$) content. After the 2nd LM, MF was considerably lower on 3× CMS and Insentec AMS farms. Lower MP results were found on 3× CMS and Insentec AMS farms. Longer milking intervals provide bacteria the time to propagate, while increased frequency removes bacteria from the udder more often. The highest SCS (3.81) was found in milk obtained from 2× CMS, but

increased milking frequency decreased SCS by 0.48. Milk SCS was the lowest (2.88) in cows milked with DeLaval AMS, and highest on Insentec (3.66) AMS farms. Irregular milking on AMS farms did not cause higher SCS, compared to CMS. SCS decreased during the first two LMs, showed subsequent modest increase until the 5th LM, then increased considerably and ultimately remained rather stable in all MSs.

Finally, increasing milking frequency from 2× to 3× will increase the MY. Another positive aspect of frequent milking is lower SCS, and a negative decreased MF and MP content. AMSs showed similar trends to those in CMSs. Decrease in MY was linear during lactation months, while the most remarkable change occurred in the 6th LM, where SCS increased considerably.