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Monitoring electrical conductivity of milk of dairy cows for the purpose of not treating with antibiotics in dry cow period

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It is known that the milk electrical conductivity (EC) measurement could be used for mastitis detection. For this purpose, an equipment - REM test (Rapid electronic mastitis test) was developed in our Institute. It is a handheld apparatus which can measure EC of milk from each quarter of the udder during whole lactation period. In our experiment we have measured EC of milk of 173 cows. EC was measured from each quarter of the udder with REM test. The EC of cows were measured weekly and SCC (somatic cell count) was tested monthly. Bacteriological examination was done on beginning in middle and at the end of experiment. The average SCC of all cows was 273 000 (sd 64 000). Experiment lasted 281 days. The statistical value of EC of healthy cows (SCC was lower than 100 000) was 4.8 mS/cm (sd 0.3 mS/cm) and cows with mastitis was 6.5 mS/cm (sd 0.8 mS/cm). The difference between them was significant ($P < 0.01$). Absolute value of milk EC of single quarter has substantially lesser sensitivity for mastitis detection than IQD (inter quarter difference). The differences of EC between quarters in the healthy cow were under 0.6 mS/cm. If EC of some quarter was higher than 0.6 mS/cm (opposite of the quarter with the lowest value) then the quarter was suspicious of mastitis. When EC values of all quarters in the udder were higher than 6.0 mS/cm and differences between them were less than 0.3 mS/cm, than the cow was suspicious of another illness than mastitis. In many cases we have found that these cows had low fat in milk which could cause the higher EC. The correlation coefficient between absolute value of EC and SCC of single quarters was $r = 0.63$. The sensitivity of the mastitis detection by means of milk EC measurement was calculated as 87% and the reliability 92%. It was evaluated for IQD with threshold difference 0.6 mS/cm and for cows with mastitis which have $SCC > 500\ 000$. The most interesting fact which we have found was that 48 cows were healthy during all lactation period (SCC was lower than 100 000). EC of these cows was 4.6 mS/cm (sd 0.3 mS/cm). We have found that these cow could be detected with IQD which was ± 0.3 mS/cm (in the most cases no more than ± 0.2 mS/cm) during all lactation period. It means that these cows did not have to be treated at dry cow period. Development of REM test was possible through projects APVV of the Slovak Research and Development Agency Bratislava (15–0060), and the project CEGEZ 26220120073 supported by the Operational Programme Research and Development funded from the European Regional Development Fund.

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