

Technical problems at mastitis detection by means of milk electrical conductivity measurement

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Many years it is known that increased milk electrical conductivity (EC) can indicate mastitis in one or more quarters of the cow's udder. The scientists have believed that this method would solve the problem with mastitis detection. The research of the problem showed many technical and methodical problems when the method was used in practice. The basic problem at milk EC measurement is material from which the electrodes are made. During the measurement of EC of milk the electric current flows through the milk to the electrodes. The particles of milk are electrically charged and the electrodes too. When particles contact the electrode they adhere to it and create coating or film on the surface of the electrode. It can change effective surface for electric current and it changes the measured EC value. We have found out the effective surface can change up to 10-15 percent and that means the measured value of EC is lesser. The threshold value for mastitis detection is 10 percent of measured value. It means the error of measurement can be higher than diagnostic threshold. The coating is unstable and changes during the measurement. In our research we have found out that no used material of measurement electrodes was suitable for this purpose. For this reason we have designed a new one. New material does not create the coatings of fat and salt on surface of electrodes. It has shown absolutely inert to the milk. Another problem has shown with air bubbles in milk. When milk is poured to the measurement chambers many air bubbles are created in the milk. In critical cases they can change the measured values of EC up to 10 percentages. It means the measured value can be 10 percent lesser than without air bubbles. To solve the problem the special slope area adjacent to the measurement chambers and the outlet pipe in the common chamber were designed.