INVESTIGATION OF TEMPERATURE INFLUENCE ON MILK IMPEDANCE FREQUENCY CHARACTERISTICS

Audrius Zajančkauskas[1], Aleksandras Savilionis[1], Eimantas Bičius[1], Vygantas Petrauskas[1], Eugenijus Aniulis[2]
[1] *Lietuvos žemės ūkio universitetas, Studentų g. 11, Akademijos mstl., LT–4324 Kauno r.*
[2] *Lietuvos veterinarijos akademija, Tilžės g. 18, LT–3022 Kaunas*

Summary. A number of indirect tests including spectral analysis of milk impedance have been developed to detect mastitis in cows. Spectral analysis of milk impedance has limitations for using in practice because is designed for use in laboratory. The objectives of this trial were to investigate the temperature influence on milk impedance frequency characteristics and to designed milk impedance measurement system..

Frequency characteristics of milk impedance have been measured by two channel signal analyzer. Signal analyser collect both input Uin(t) and Uout(t) signals from milk impedance measurement scheme. Signal Uout(t) was divided by referent resistor R and afterwards the output of currency Iout(t) was estimated. From the Furje transformation on measured input voltage Uin(t) and current Iout(t) the amplitude spectra Uin(f) and Iout(t) of those signals was detected. The milk indipence Z (f) finction was determined by dividing Iout(f) to Uout(f).

It was estimated that temperature have shown significant influence to the real Re[H(jω)] and imaginary Im[H(jω)] part of milk impedance frequency characteristics. For example if the milk sample temperature have shown from 12^0C to 20^0C the imaginary part Im[H(jω)] of milk impedance frequency characteristics In this case if the 0,5% temperature uncertainty of milk impedance characteristics was given tgiven ^{0}C ± 0,125 ^{0}C. During the experiment we hold milk temperature in the range of tgiven^{0}C ± 0,75^{0}C so we have had 6% uncertainty of milk impedance characteristics from the temperature fluctuation. It was shown that temperature influence on milk impedance is not linear. In conclusion during measure of milk impedance characteristics the milk sample temperature must be held in certain range with possible less temperature fluctuation.

Keywords: milk, impedance, temperature, mastitis.