

## **CORRELATIONS BETWEEN RECTAL, SURFACE AND EYE TEMPERATURE MEASURED BY INFRARED THERMOGRAPHY IN HOLSTEIN HEIFERS**

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Heat stress is one of the biggest challenges of Brazilian milk production. Variables that can indicate differences in animal body temperature are important in order to recognize heat stress, genetic differences between animals and diseases. The objective of this work was to verify correlations between rectal, surface and eye temperatures. The experiment was carried out in Santana do Livramento-RS in March, 2018 in two consecutive sunny days. Ten Holstein heifers (five red and five black) averaging six months old were used. The measurements started at 10 a.m. and were performed in a naturally shadowed pen, where the animals had been kept for 2h. The variables measured were: rectal temperature (RT), surface temperature from pigmented spots (TPS) and white spots (TWS) and Eye temperature (ET). The RT variable was measured by a mercury thermometer. TPS and TWS were measured by a laser thermometer pointed to spots (white and pigmented) on the heifers' flanks, from a 50cm distance (four measurements were taken, and its average was used). The measurement of the ET variable was performed by infrared thermography, using a Thermal Imager camera (Testo 870-1®) from a distance of 3m. Pearson correlations of all variables against all were performed in the statistical software Graphpad Prism 6.0. RT and ET showed moderate correlation ( $p=0.569$ ). Since both RT and ET are body temperature indicators a stronger correlation should be expected. An explanation for this moderate correlation can be the fact that ET showed a greater variance (standard deviation  $\pm 1,27$ ) than RT. This higher variance from ET can be due to the thermography which is highly affected by environmental conditions, such as wind and luminosity. TPS and TWS also showed moderate to strong correlations with RT (0.74 and 0.68 respectively) and to ET (0.74 and 0.78, respectively) which indicates that surface temperature is much related to body temperature. These correlations could not be stronger, since several other factors are involved in body temperature and not all the heat from the surface is transmitted to the inside of body. TPS and TWS showed strong correlation between each other (0.91) which was expected, since they are both measures of surface temperatures from close regions in the same animal. Despite pigmented spots having higher temperature, animals with higher TRS also showed higher TWS.

**Keywords:** dairy cows, heat stress, thermometer