

Thermography for evaluation of heat stress in beef cattle

Fabiana V. Alves*¹, Bruna Ferrari², Gilberto R. O. Menezes¹, Eliane V. Costa e Silva², Nivaldo Karvatte Jr.³, Ariadne P. Mastelaro⁴, Rodrigo A. L. Franco², Camilla D. Barreto⁵

¹Brazilian Agricultural Research Corporation – Embrapa Beef Cattle, Campo Grande, MS, Brazil, ²Federal University of Mato Grosso do Sul – UFMS, Campo Grande, MS, Brazil,

³Federal University of Goiás, UFG, Goiânia, GO, Brazil, ⁴Federal University of Paraná, UFPR, Curitiba, PR, Brazil, ⁵Federal University of Recôncavo da Bahia – UFRB, Cruz das Almas, BA, Brazil.

*fabiana.alves@embrapa.br

Food-producing animals have characteristics that can be measured and interpreted as indicators of their thermal comfort. Among these, some physiological parameters are common used in cattle because their importance in thermoregulatory processes. The difficulty is to evaluate them without interference by handling stress and the use of infrared thermography can be an alternative to this problem. Thereby, the aim of this trial is to evaluate the use of Infrared thermography (IRT) as a tool for assessment of animal heat stress. The experiment was conducted at Embrapa Gado de Corte, Campo Grande-MS, in August 2015. We evaluated forty seven animals (23 females and 24 males) of four genetic groups, as follows: 12 Nelore, 12 ½ Nelore x ½ Caracu, 12 ¾ Caracu x ¼ Nelore e 11 ¼ Angus x ¼ Nelore x ½ Caracu, with an average weight of 290 kg and about 15 months of age. Two thermographic images were collected from each animal (front and left side of head) with a thermographic camera and analyzed using a image program. Also the respiratory rate (by visual count), heart rate (using an stethoscope), surface temperature of the skin and hair coat (using a pyrometer), rectal temperature (using a digital thermometer) and sweating rate (measured using filter paper discs impregnated with cobalt chloride 10% solution), on the dorse and rump. Pearson correlation was used for the surface temperatures and physiologic parameters. No correlation ($p>0,001$) was found between the data obtained through thermography (eye temperature and head) and physiological parameters. Although, there was a high correlation ($p<0,005$) between superficial skin temperature measured in dorse and rump (0.86), and hair coat temperature (0.78). There was also a high correlation ($p<0,005$) between sweating rate measured in both anatomical regions (0.90) (dorse and rump). The surface temperature of the skin and hair coat (0.70 and 0.79) also showed high correlation each other, in both places. Thereby, further studies are needed to evaluate the potential use of thermographic imaging for non-invasive measurement of heat stress condition. Furthermore, the surface temperature and sweating rate can be measured in only one anatomic region according the facility to access it.

Keywords: animal welfare, bovine, IRT temperature, thermal comfort, thermoregulation.

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