



Mini Review

Volume 12 Issue 4 - June 2019
DOI: 10.19080/JDVS.2019.12.555844

Dairy and Vet Sci J

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Use of Infrared Thermography in Animal Production



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Submission: May 21, 2019; **Published:** June 20, 2019

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Abstract

Infrared Thermography (TIV) is a non-invasive, safe technique that is capable of analysis and applicability in several areas. The objective of this study was to identify the importance of infrared thermography in production animals. In the study developed by Ferreira et al. (2011), TIV was used to evaluate the metabolic heat variations produced by chicks, the authors concluded that infrared thermography was able to efficiently detect the metabolic activity of juvenile birds. In goats, D'Alterio et al. (2011) evidenced unstable changes in the hull surface temperature flow, with the use of TIV. Graciano (2013) developed a study with pigs using the TIV and identified that the thermographic technique presents good efficiency for a pre-diagnosis of inflammatory changes and lesions, being able to be used as an aid, avoiding that reproducers are discarded. In view of the above, it is concluded that TIV presents applicability in different species of production animals, in addition, it is confirmed that TIV is relevant in the animal production area, because it functions as a body scanner, helping to show variations in the temperature of which may indicate metabolic changes or the onset of inflammatory processes.

Keywords: Cattle; Calf; Animal welfare; Thermogram

Introduction

In the area of Veterinary Medicine and Livestock, the aim is to develop improvement techniques in the field of agricultural sciences, benefiting medical clinics, veterinary sciences and scientific research [1]. Current technological advances provide a milestone in the emergence of new forms of diagnosis and prevention. The environment directly influences the animal development, with that, the search for early physiological changes are important. Non-invasively, infrared thermography shows an extremely precise technique capable of identifying changes in surface temperature and avoiding animal stress. This technique has functionality in production, company and laboratory animals [2]. Infrared thermography has been showing interest in several areas, as researchers consider advances in technique that is proving increasingly effective and accurate [3]. Infrared Thermography (TIV) is a non-invasive, safe technique that is capable of analysis and applicability in several areas. With the use of TIV, animals must be captured or restrained, avoiding stress and promoting animal welfare [4]. Among the advantages of using IVT, it can be used to prevent diseases, by detecting the increase in temperature before the appearance of the initial clinical signs,

thus, it indicates the need to observe the evaluated animal; allows to identify physiological changes, besides being flexible for its application in areas of livestock farming [5]. In view of the above, it was aimed to point out the importance of infrared thermography in production animals.

Discussion

In the study developed by Ferreira et al. [6] used the TIV to evaluate the metabolic heat variations produced by chicks, the authors concluded that infrared thermography was able to efficiently detect the metabolic activity of juvenile birds. In goats, D'Alterio et al. [7] showed unstable changes in the hull surface temperature flow, with the use of TIV. Graciano et al. [8] developed a study with pigs using TIV and identified that the thermographic technique presents good efficiency for a pre-diagnosis of inflammatory alterations and lesions, being able to be used as an auxiliary, avoiding that reproducers are discarded. Nogueira et al. [9] in their study examined the mammary gland of dairy cows, the results showed differences in surface temperatures, varying according to the stages, being: animals without inflammatory

processes had TS of 38.2 °C, animals with clinical mastitis 39,3 °C, animals with subclinical mastitis 37.3 °C, thus, TIV may aid in the diagnosis of mastitis.

Silva et al. [10] evaluated with the aid of infrared thermography the monthly scrotal temperature of eleven adult buffaloes, males, mestizos belonging to the crossbreeding of the Murrah and Mediterranean races, semen samples were subjected to analysis of progressive motility, vigor, coarse motility, volume and sperm concentration, in addition to the plasma membrane evaluated for its integrity by the eosin-nigrosine staining technique. The results showed that the scrotal temperature was 4.6 °C below the mean of body temperature (38.5 °C), thus showing that the animals were weaned with the scrotum / testicular thermoregulation under proper conditions, since body temperature of bulls should be between 2 to 6 degrees lower than body temperature, to be considered a semen of good quality. Scrotal evaluation showed that the scrotal temperature was 34.0 °C, morbidity ($\geq 30\%$) and sperm morphology ($\geq 70\%$ of normal spermatozoa). Before the study, it can be concluded that the infrared thermography can be used in the andrological evaluation of bulls. Silva et al. [11] used TIV in calves, and found that the technique identified thermal abnormalities, detecting calves with physiological changes caused by pathogens which were evidenced by ocular temperature. Chacur carried out a study evaluating cow herds and identified surface temperatures in the base ceiling (30.6 °C to 36.8 °C), average ceiling (29.7 °C to 36.9 °C) and final ceiling (30.0 °C to 36.0 °C).

Based on previously reported studies in the animal production area, it can be observed that infrared thermography presents itself as a tool capable of scanning the surface temperature of different species of animals, helping in the early diagnosis of some diseases.

Conclusion

The TIV has applicability in different species of production animals, in addition, it is confirmed that the TIV is relevant in the animal production area, as it functions as a body scanner, helping

to show variations in surface temperature that may indicate metabolic or beginnings of inflammatory processes.

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DOI: [10.19080/JDVS.2019.12.555844](https://doi.org/10.19080/JDVS.2019.12.555844)

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