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Implementation of biometric technology to assess physiological responses to stress and their relation with beef quality

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Statement of the Problem: The stress that animals experience due to environment and management conditions have become a main concern among producers and the general public. The animal stress during the pre-slaughter process not only impacts the cattle welfare but also the meat quality. Stress has been proven to impact on the eating qualities of beef, such as colour, tenderness, flavour and juiciness, as well as the shelf-life of meat. Studies have shown that physiological parameters can be used as indicators of stress in animals. However, the techniques used to obtain these parameters are often invasive and can increase the stress in animals. Moreover, they are time consuming and labour intensive. The purpose of this study is to define whether non-invasive techniques that measure temperature and Heart Rate (HR) can be used to identify stress levels and predict their effect on meat quality. Methodology & Theoretical Orientation: Infrared and video cameras were placed in four farms and in the abattoir to obtain images, which were analyzed to obtain HR and Temperature by using algorithms in MatLab. These physiological parameters were correlated with indicators of meat quality obtained from the carcasses at the abattoir. Findings: The physiological parameters obtained by these non-invasive methods showed medium to high correlation with ultimate pH and meat colour. In addition, the Heart rate measured at the abattoir showed a significant difference ($P < 0.0001$) between cattle that presented DFD or high ultimate pH, and the cattle that did not present these conditions. Conclusion & Significance: Heart Rate appears to have strong relationship with meat quality. In addition, biometric technology could be a useful tool to assess physiological responses to stress in abattoirs. Moreover, results suggest that the data obtained by Biometric methods could be used to assist in improving prediction of beef quality.

Biography

Maria Jorquera-Chavez has expertise in assessing behavioural and physiological responses to stress in animals and on the impact that stress has on the productive performance of dairy and beef cattle. She has become passionate in developing and improving methods to assess and ameliorate stress levels in animals. Her studies are addressed to generate new pathways to assist in improving animal welfare and animal production. She has been involved in the development of these technologies during her studies at The University of Melbourne. These projects are based on several studies related to human emotions when they face different situations. These studies have shown that Biometric technology is a useful tool to identify changes in physiological parameter when people is exposed to different situations. After observing these good results in humans, Maria decided to develop Biometric technologies to be used in research related to animal stress.

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