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A bench-top hyperspectral imaging system to classify beef from Nellore cattle based on tenderness

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ABSTRACT

The aim of this study was to evaluate the accuracy of classification of Nellore beef aged for 0, 7, 14, or 21 days and classification based on tenderness and aging period using a bench-top hyperspectral imaging system. A hyperspectral imaging system (λ = 928-2524 nm) was used to collect hyperspectral images of the Longissimus thoracis et lumborum (aging n = 376 and tenderness n = 345) of Nellore cattle. The image processing steps included selection of region of interest, extraction of spectra, and indentification and evalution of selected wavelengths for classification. Six linear discriminant models were developed to classify samples based on tenderness and aging period. The model using the first derivative of partial absorbance spectra (give wavelength range spectra) was able to classify steaks based on the tenderness with an overall accuracy of 89.8%. The model using the first derivative of full absorbance spectra was able to classify steaks based on aging period with an overall accuracy of 84.8%. The results demonstrate that the HIS may be a viable technology for classifying beef based on tenderness and aging period.

Keywords: aging time, *Bos indicus*, meat quality, shortwave infrared, warner-bratzler shear force