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NEAR INFRARED HYPERSPECTRAL IMAGING FOR CLASSIFICATION OF BEEF MUSCLES

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ABSTRACT Hyperspectral imaging has gained widespread importance in many applications in food safety as well as quality control and monitoring of various food products. Rich spatial and spectral information offered by hyperspectral images provides detailed material composition which requires challenging pattern recognition routines to deal with this complex nature. Therefore, by using various image processing techniques objects can be categorized and correctly classified. The objective of this study is to develop and test a near infrared (NIR) hyperspectral imaging system to classify different beef muscles. A pushbroom hyperspectral imaging system in the near infrared region (900–1700 nm) was developed and calibrated. Hyperspectral images of beef steaks originated from *Longissimus dorsi*, *Psoas major* and *Semitendinosus* muscles at 2-day post-mortem were acquired. All images were corrected and calibrated for reflectance and dark current of the camera. An image processing routine to deal with spectral image at different wavelength was developed for segmenting image to isolate the lean area of the sample as the main region of interest (ROI). The segmented lean area (ROI) was then used as a mask to extract spectral information from each muscle. Spectral data was then analysed by multivariate principal component analysis (PCA) to reduce the dimension along the spectral axis. The first three principal components explained over 97% of the variance of all spectral bands in the image. The results indicated that hyperspectral imaging has a considerable potential for classifying beef muscles.

Keywords: Hyperspectral imaging, multivariate analysis, pattern recognition, beef, food quality.