NEAR-INFRARED (NIR) REFLECTANCE SPECTROSCOPY FOR EVALUATION OF BEEF TENDERNESS IN NELLORE CATTLE

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A study was conducted to evaluate near-infrared reflectance spectroscopy (NIRS) measurements in Nellore beef cattle samples in order to obtain predicting equations for Warner-Bratzler shear force (WBSF) values, using reflectance percentages for different wave lengths. Data from 46 Longissimus dorsi (LM) samples were obtained from Nellore beef cattle slaughtered after 120 days in feedlot. After 24 hours of chilling at 2°C carcasses were ribbed between 12th and 13th ribs and two samples of 2.5 cm thick of the LM were taken, from cranial to caudal direction. After each period of ageing samples were frozen at −18°C for further WBSF and NIRS were evaluated at one day (MAC01D) and 14 days (MAC14D) post mortem. Before performing analysis, samples were thawed in refrigerator (2 to 5°C) for 24 hours. After removal from the vacuum package samples were bloomed by 20 min for posterior NIR scanning. NIRS analyses were performed using a spectrophotometer model EPP2000-CXR-Srs and EPP2000-InGaAs (Stellarnet Inc., Tampa, FL). Data was collected with SpectraWiz software (Stellarnet Inc., Tampa, FL). Each sample was scanned three times at different locations throughout the LM sample. NIRS measurements allowed evaluations of reflectance percentages for wave lengths between 200 and 1,700 nm. Cluster analysis for reflectance percentages in different wave lengths were used, and regression analyses were performed for MAC01D and MAC14D with regard to specific reflectance percentages wave lengths. Correlations between actual and predicted MAC01D and MAC14D values, based on NIR spectroscopy, were 0.82 and 0.81, respectively. However, the estimate of correlation between actual MAC14D and MAC014D predicted using reflectance percentages for wave lengths obtained in one day post mortem, was -0.07. These results suggest that:

(i) cluster analysis were effective in discriminating reflectance percentages associated with specific wavelengths that best explain the observed variations for MAC01D and MAC14D and,

(ii) regression models based the reflectance percentages associated with wavelengths specified should be the target of investigations aimed at assessing the feasibility of use in Nellore animals raised under similar conditions to fit the regression models at the level of commercial use.