Title Prediction of beef quality attributes using VIS/NIR hyperspectral scattering imaging technique

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Abstract

Hyperspectral imaging images were used to predict fresh beef tenderness (WBSF: Warner–Bratzler Shear Force) and color parameters (L^*, a^*, b^*). Sixty-five fresh strip loin cuts were collected from 33 carcass after 2 days postmortem. After acquiring hyperspectral images, the samples were vacuum packaged and aged for 7 days, and then the color parameters and WBSF of the samples were measured as references. The optical scattering profiles were extracted from the images and fitted to the Lorentzian distribution (LD) function with three parameters. LD parameters, such as the scattering asymptotic vale, the peak height, and full scattering width were determined at each wavelength. Stepwise discrimination was used to identify optimal wavelengths. The LD parameters' combinations with optimal wavelengths were used to establish multi-linear regression (MLR) models to predict the beef attributes. The models were able to predict beef WBSF with R_{cv} = 0.91, and color parameters (L^*, a^*, b^*) with R_{cv} of 0.96, 0.96 and 0.97, respectively.