

Quality evaluation of watermelon using laser-induced backscattering imaging during storage

ABSTRACT

Non-destructive and optical-based technologies are rapidly being engaged as alternative techniques for monitoring quality changes in agricultural produce. In the present work, the feasibility of laser-induced backscattering imaging was investigated to predict the changes of firmness, soluble solids content (SSC), pH, and moisture of watermelon during storage. Backscattering images were obtained from Black Beauty and Red Seedless watermelons using a laser diode emitting at the wavelength of 658 nm. Different multivariate methods were evaluated on the backscattering parameters (BP) for monitoring the quality changes of watermelons at different storage days. A partial least squares (PLS) regression was applied to the BP extracted from the backscattering images to analyze the quality attributes of the two watermelon cultivars. Among all of the quality changes, the moisture prediction gave the highest coefficient of determination (R^2) of 0.942 and root mean square error of prediction (RMSEP) of 0.492, respectively. Therefore, this study has demonstrated the capability of laser-induced backscattering imaging as a useful, rapid, and non-invasive optical technique for the evaluation of the quality of watermelons during storage.

Keyword: Laser light; Backscattering imaging; Watermelon; Quality evaluation; Storage