A rapid and non-destructive detection of *Escherichia coli* on the surface of fresh-cut potato slices and application using hyperspectral imaging

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Abstract

The contamination of foodborne *Escherichia coli* in fresh-cut products has become a major problem of public health around the world, so that early and rapid detection of contamination is crucial. This study explored the potential of hyperspectral imaging (HSI) measurement of contamination on the surface of fresh-cut potato slices in visible-near infrared (Vis-NIR, 400-1000 nm) region. Four preprocessing methods and the genetic algorithm (GA) were explored to handle spectral data and select characteristic wavelengths so as to establish linear and non-linear regression models. The performance of the back-propagation neural network (BP-NN) model based on full-spectrum was satisfactory, with an overall accuracy of 97.6 % and residual predictive deviation (RPD) of 6.7. Based on the BP-NN model, the research successfully explored the optimum treatment time (20 min) of a non-thermal and environmental-friendly method to inactivate the *E. coli* on the surface of fresh-cut potato slices, thus confirming the potential application of HSI for the first time. The overall results showed that HSI could provide a rapid and non-destructive approach for the detection of foodborne pathogens on the surface of fresh-cut products.