Title Detection of external insect infestations in jujube fruit using hyperspectral reflectance imaging

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Abstract

A hyperspectral reflectance imaging approach in the spectral region of 400–720 nm was developed for the detection of external insect damage in jujube fruits. The peel conditions of jujube samples were tested at undamaged stem-end/calyx-end/cheek regions and at insect-damaged stem-end/cheek regions. A stepwise discriminant analysis was used to classify the jujubes as insect-infested or free of infestation based on the identified effective wavelengths. According to the results, none of the sound cheek or undamaged calyx-end regions was misclassified as having stem-end or insect infestation. Over 98.0% of the intact jujubes and 94.0% of the insect-infested jujubes represented in the images were correctly recognised, and the overall classification accuracy was about 97.0%. The results demonstrated that hyperspectral imaging based on a statistically derived discriminant function can be used to discriminate insect infestation from other confounding surface features in jujubes.