

Comparison of a dual-laser and a Vis-NIR spectroscopy system for detection of chilling injury in kiwifruit

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Abstract

A novel dual-laser system with laser wavelengths of 730 nm and 850 nm has been developed for the non-destructive detection of chilling injury in *Actinidia chinensis* var. *chinensis* 'Zesy002' kiwifruit. Chilling injury in kiwifruit is a physiological disorder that may occur during low-temperature storage, with symptoms that are often not evident until the fruit is cut open. This study involved a sample of 162 kiwifruit with differing severity of chilling injury, and a performance comparison between the novel dual-laser system and a standard visible – near infrared (Vis-NIR) interactance spectroscopy approach proven in a prior study. The dual-laser system involved scanning the laser beams across the fruit to generate spatial profiles of light transmission in the fruit. Data analysis with supervised model training, using a support vector machine algorithm, was successfully used to achieve cross-validation prediction accuracies higher than 90 % for distinguishing sound and chilling-injured kiwifruit. The performance was equivalent to that achieved by the Vis-NIR interactance spectroscopy approach, suggesting that the dual-laser method is an alternative and more attractive option because of its easier system layout for high-speed on-line sorting of kiwifruit for chilling injury disorder.