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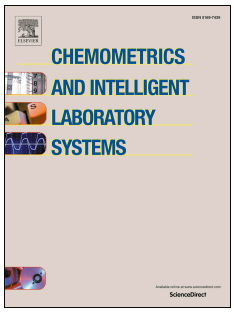

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Detecting and classifying Minor Bruised Potato Based on Hyperspectral Imaging

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Abstract: Potato with minor bruise is difficult to be detected in the process of damage identification and is perishable in storage, thus leading to a serious problem of food safety and economic issue. In view of the complexity of bruise detection for potatoes, a nondestructive detection method, based on hyperspectral imaging technique, was proposed in this study. All samples, including healthy potatoes and bruised potatoes belonging to 3 different levels, were taken as experiment objects. First of all , the background in every hyperspectral image was removed by masking aiming at acquiring the average spectra of each potato. Then, Savitzky-Golay smoothing, first derivative, second derivative, standard normal variate and its combinatorial methods were applied to pre-process spectral data, respectively, and the grid search algorithm was applied to optimize modeling parameters. Confirm that the standard normal variate pre-processing technique reinforced the model performance at utmost, and the identification accuracy of bruised samples reached 90.63%. In addition, given the interference of redundant information, the optimized simulated annealing algorithm based on correlation coefficient algorithm was applied to reduce the dimension of the spectral data, which promoted the identification accuracy of bruised samples to 96.88%. Furthermore, the bruise levels of samples were classified using