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Development of on-line detection system for simultaneous assessment of edible quality and internal defect in apple by NIR transmittance spectroscopy

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In order to simultaneous non-destructive on-line inspect edible quality and internal defect of apple, this work presents the development of an on-line detection prototype system using near infrared transmittance technology as a novel approach for on-line detect quality attributes without sample destructiveness. The on-line detection system was designed and developed to improve spectra signal quality, lower heat damage, reduce mechanical damage. Special detection software was developed for real-time inspection based on multithread programming technology. In this experiment, internal defects of apple caused by core rot fungi are collected and cultivated, because the natural internal defects apple sample is difficult to collect. We tried the preparation of samples and achieved good performance. It was achieved internal quality information in non-destructive online way by this system. Partial Least Squares-Discriminant Analysis (PLS-DA) models were developed to identify internal defects samples. The results obtained from PLS-DA models, in validation, gave a positive predictive value of classification about 91%. Moreover, predictive models were performed applying fast PLS regression algorithm to predict the Soluble Solid Content (SSC) in apple. Very good results were obtained for SSC with R2 and RPD equal to 0.90 and 3.00, respectively. The results showed that the non-destructive on-line detection prototype based on NIR transmittance technique was feasible to simultaneous inspect the edible quality and internal defect of apple. The present research provides the foundation for the future development of an automatic system based on transmittance spectroscopy which is extremely important from the economic point of view.

Biography

Zhiming Guo has completed his PhD from China Agricultural University and Postdoctoral studies from Jiangsu University, School of Food & Biological Engineering. He is the Director of Agricultural Engineering and presently a Lecturer in Jiangsu University, School of Food & Biological Engineering. He has published more than 30 papers in reputed journals.

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