

Title NIRS Detection of Moldy Core in Apples
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Abstract

Moldy core of apples is undetectable until the fruit is cut open or bitten into, therefore it can pose serious problems to both producer and consumer. Removal of diseased fruits prior to storage would be most desirable. The objective of this study was to evaluate the ability of VIS-NIR minispectrometers to detect moldy core in apples, on line. An apparatus which is qualified for on-line Near-Infrared Spectroscopy (NIRS) measurements was developed based on an off-the-shelf minispectrometer. Apples, cv. Red Delicious, were collected from several orchards before and during the commercial harvest, and were stored at 0°C pending the tests. The data were analyzed by chemometric procedures, specifically, by partial least squares regression (PLSR), and were classified by means of canonical discriminant analysis. The canonical variables were represented by the latent variables of PLS models based on the spectra. The accuracy of the classification results was high, in light of doubts regarding the moldy fraction threshold of 5%; in such a case the mold covers only the seed carpals of the fruit, where it might remain without really damaging the fruit. Improvements should aim to reduce errors in classifying low-level damage, and also in misclassifying some healthy fruits. The rate of testing (1 s per fruit) is acceptable for quality-control purposes, but should be accelerated for future packing-line implementation.

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