

Title Hyperspectral fluorescence imaging for on-line safety inspection of apples

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Citation Abstracts of 27th International Horticultural Congress & Exhibition (IHC 2006), August 13-19, 2006, COEX (Convention & Exhibition), Seoul, Korea. 494 pages.

Keywords apple; food safety; fecal contamination; fluorescence imaging; apple sorting machine

Abstract

Fruits and vegetables contaminated with animal fecal matter is recognized as a major source of pathogenic *E. coli* 0157:H7. A prototype, fast line-scan hyperspectral imaging system integrated with a commercial apple-sorting machine was evaluated for rapid detection of animal feces matter on apples. Apples obtained from a local orchard were artificially contaminated with cow feces. For the on-line trial, hyperspectral images with 70 spectral channels, reflectance in the visible to near infrared regions and fluorescence emissions with UV-A excitation, were acquired from apples moving at a processing line speed of over 3 samples per second. Reflectance and fluorescence imaging required a passive light source, and each method used independent continuous wave (CW) light sources. In this paper, integration of the hyperspectral imaging system with the commercial apple-sorting machine and results for detection of fecal contamination on apples based on the reflectance and fluorescence imaging methods are presented.