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Reflectance spectrophotometry of bruising in potatoes. II. acquisition of spectra in the visible spectrum with an integrating sphere

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abstract Diffuse reflectance spectra from 400 to 700 nm were measured with an integrating sphere from bruised and unbruised, unpeeled and peeled tubers cvs. Desiree, Pentland Dell and Record. Stepwise discriminant analysis was used to determine wavelengths that were sensitive to bruising and to formulate classification algorithms to determine whether a tuber from an unknown sample was bruised. Wavelengths selected from unpeeled tubers were dependent on cultivar, while spectra from peeled tubers were independent of cultivar. The accuracy of classifying tubers as bruised or unbruised was between 76 and 91% for unpeeled tubers and 89 and 100% for peeled tubers. When the identity of tubers was unknown to the discriminant program, 70 to 82% of unpeeled and 73 to 83% of peeled tubers were correctly classified as bruised or unbruised. The integrating sphere increased the percentage of spectra correctly classified compared to spectra collected with a bifurcated fibre optic light guide. The increased accuracy was due to a smaller experimental error, greater sampling area and the acquisition of more truly diffuse reflectance.

keywords Solanum tuberosum L., quality, damage, internal