Selection of Spectral Resolution and Scanning Speed for Detecting Green Jujubes Chilling Injury Based on Hyperspectral Reflectance Imaging

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Figure S1 shows the selection probability of each wavelength at scanning speeds of 8 mm/s and 20 mm/s for the spectral resolution of 2.51 nm and 10.08 nm, respectively. The selection probabilities of wavelengths in the range of 701–930 nm were relative higher than those over 430–700 nm and 931–1023 nm, which were similar to those of 1.25 nm and 5.03 nm.

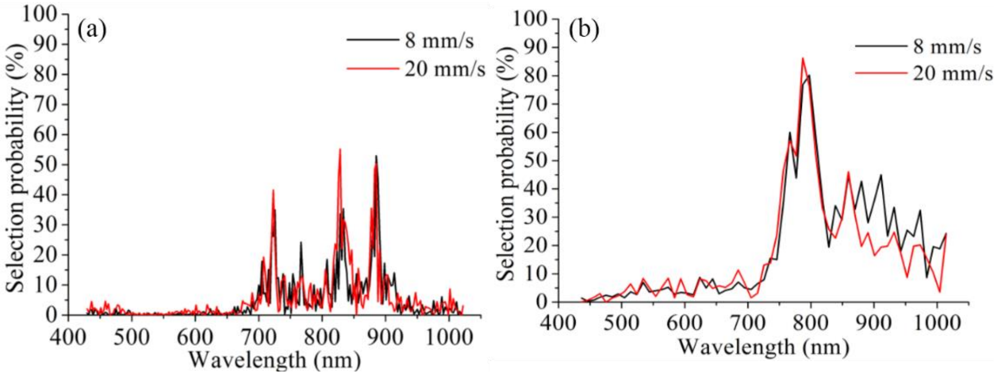

Figure S1. The selection probability of each wavelength calculated by random frog at different scanning speeds and spectral resolutions of 2.51 nm (**a**) and 10.08 nm (**b**), respectively.

The first ten wavelengths selected by random frog at scanning speeds of 8 mm/s and 20 mm/s with spectral resolutions of 2.51 nm and 10.08 nm, respectively (Table S1). The first ten selected wavelengths were quite similar under the same spectral resolution. For hyperspectral images with 2.51 nm spectral resolution, most selected wavelengths were over 800 nm, which was similar to those of 5.03 nm, but opposite to those of 10.08 nm.

Table S1. The first ten wavelengths selected by random frog at 8 mm/s and 20 mm/s with spectral resolutions of 2.51 nm and 10.08 nm, respectively.

Spectral Resolution (nm)	Speed (mm/s)	Wavelengths (nm)
2.51	8	885, 888, 834, 726, 828, 880, 720, 890, 723, 767
	20	828, 885, 883, 826, 723, 877, 834, 836, 839, 720
10.08	8	797, 787, 767, 808, 911, 859, 777, 880, 818, 901
	20	787, 797, 767, 808, 777, 756, 859, 818, 870, 849

Figure S2 shows the two-class classification performance of LDA classifier that used different number of spectral features at scanning speeds of 8 mm/s and 20 mm/s with spectral resolutions of 2.51 nm and 10.08 nm, respectively. For two-class classification using data with 2.51 nm spectral resolution, it reached the highest discriminating accuracies of 99.2% and 98.3% for 8 mm/s and 20 mm/s with optimal feature number of 7 and 8, respectively (Figure S2a). Compared with 5.03 nm, it obtained the same classification results with two more selected features at 20 mm/s (6 for 5.03 nm). However, the classification performance based on data with 10.08 nm spectral resolution was poor than the other combinations (Figure S2b).

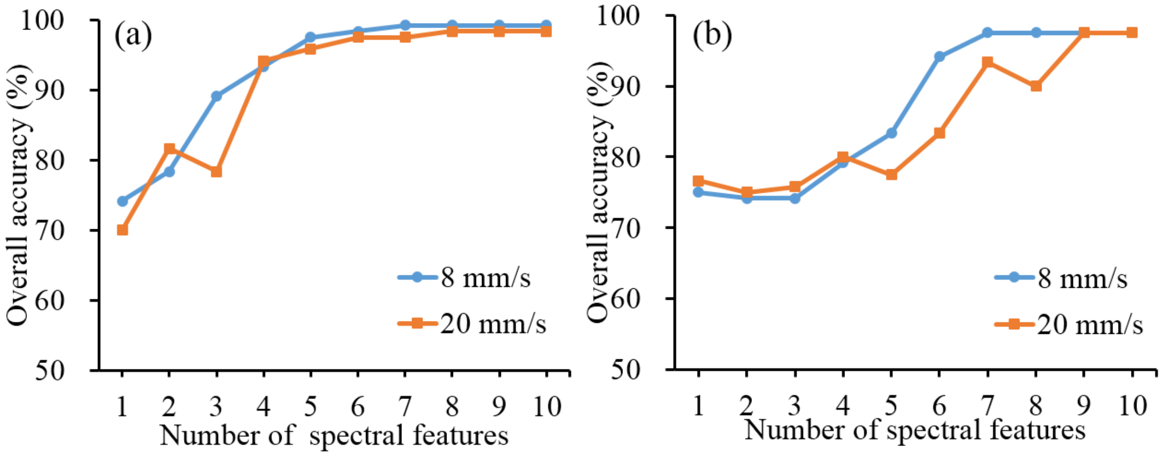

Figure S2. Two-class performance comparison based on spectral features at different scanning speeds and spectral resolutions of 2.51 nm (**a**) and 10.08 nm (**b**), respectively.

For three-class classification using data with spectral resolution of 2.51 nm , it reached the highest discriminating accuracies of 97.5% and 93.3% for 8 mm/s and 20 mm/s with optimal feature number of 7 and 6, respectively (Figure S3a), which were comparable to the those of 5.03 nm. However, the performance for three-class classification using data with 10.08 nm spectral resolution was not as good as the other combinations (Figure S3b).

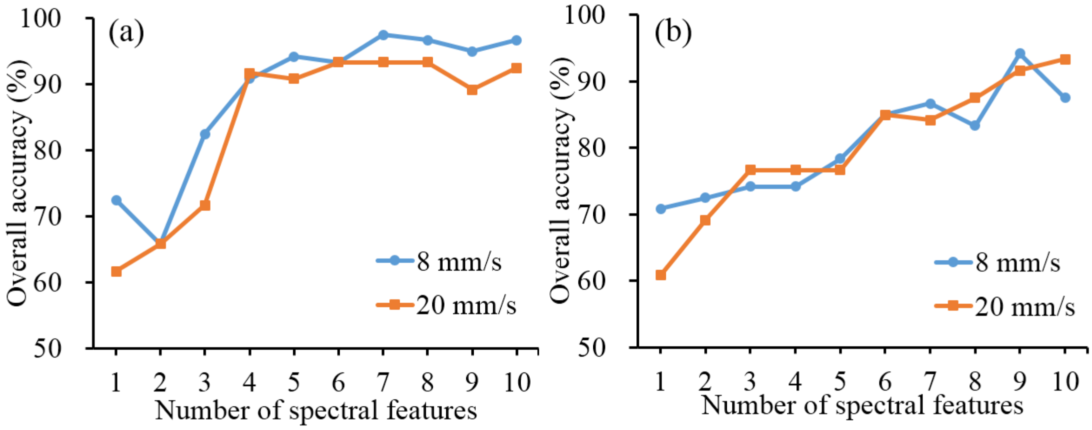

Figure S3. There-class performance comparison based on spectral features at different scanning speeds and spectral resolutions of 2.51 nm (**a**) and 10.08 nm (**b**), respectively.

The discriminant capability of the image-based features at speeds of 8mm/s and 20 mm/s with spectral resolutions of 2.51 nm and 10.08 nm is shown in Figure S4. Similar the other combinations, it achieved poor detecting results, implying that image textural features might be not suitable for green jujube chilling detection.

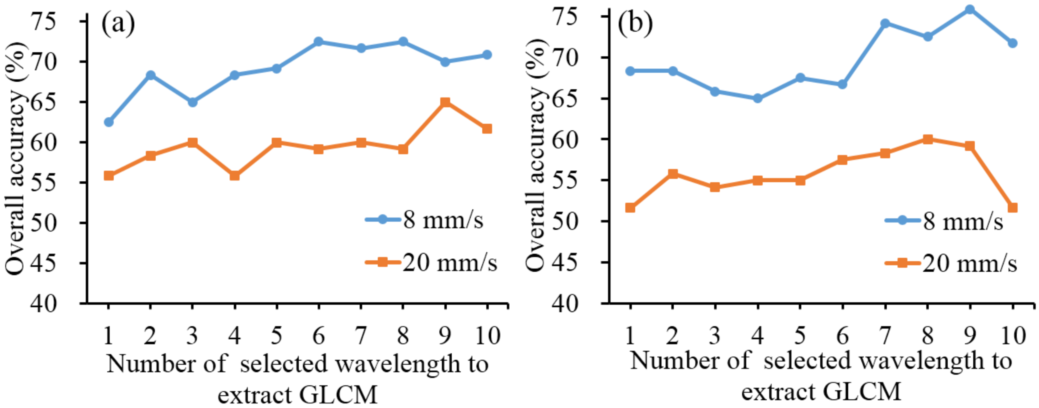

Figure S4. There-class performance comparison based on image textural features at different scanning speeds and spectral resolutions of 2.51 nm (**a**) and 10.08 nm (**b**), respectively.