

Raman Spectroscopy of Pumpkin

The spectra of pumpkin skin were collected with Lightnovo ApS miniRaman Power 785nm spectrometer (Figure 1). The following settings were used: power 91mW, exposure time 1000ms, 10 repetitions. Middle distance probe (15mm) was used for the measurements.



Figure 1. Lightnovo miniRaman 785 nm spectrometer.



Figure 2. Measurements of pumpkin skin with miniRaman equipped with the contact probe.

Transmittance correction and background correction were applied before taking the measurements. Raman spectra of pumpkin skin are provided in Figure 3.

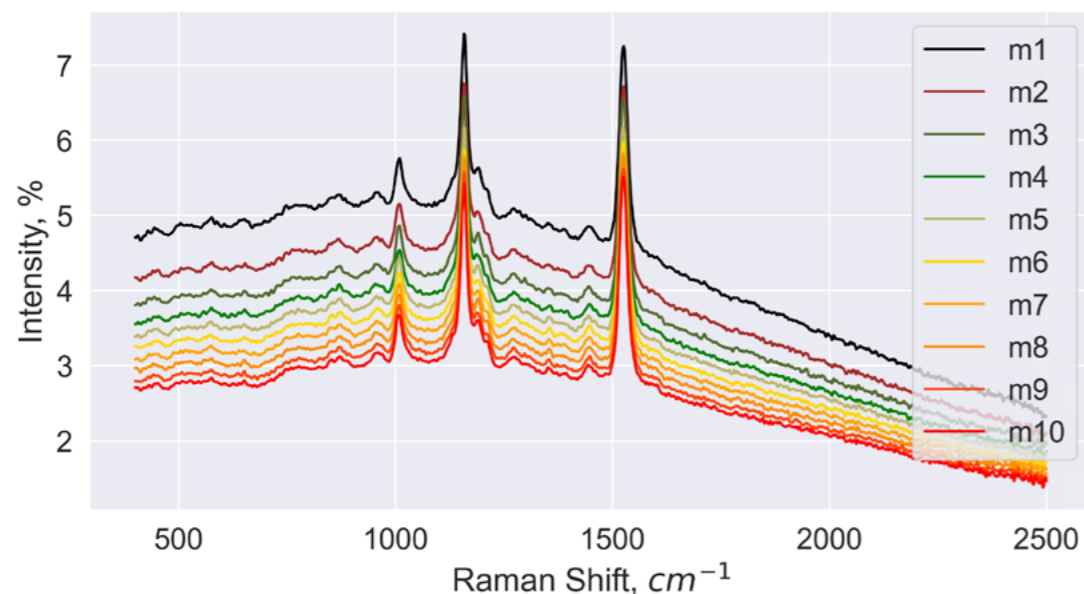


Figure 3. Raman spectra of pumpkin skin.

Baseline correction was applied to the spectra to eliminate fluorescence background. Baseline corrected spectra (10 measurements) are provided in Figure 4. Rolling filter with radius 2000, scale Y 0.1 was used.

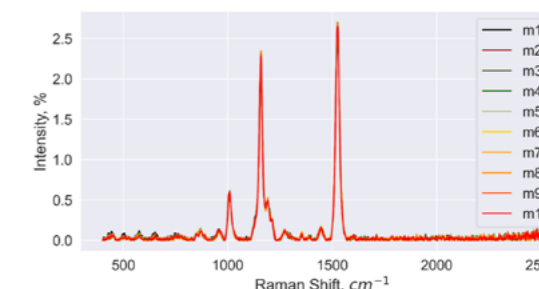


Figure 4. Baseline corrected Raman spectra of pumpkin skin.

The raw spectra of the pumpkin skin displayed in Figure 3 have fluorescence background which is eliminated upon applying rolling filter baseline correction as shown in Figure 4. The fluorescence background is decreasing upon each subsequent scan on the same spot due to photobleaching effect (Figure 3) while the amplitude of Raman signal remains constant (Figure 4). Averaged Raman spectrum of pumpkin skin and averaged baseline corrected Raman spectrum of pumpkin skin are provided in Figures 5 and 6 respectively.

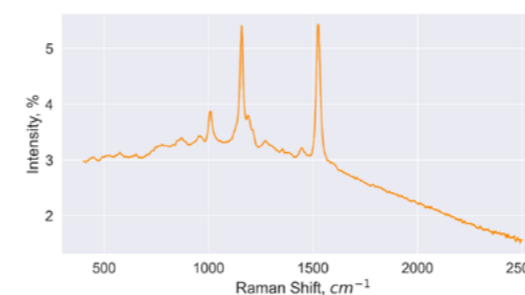


Figure 5. Raman spectrum of pumpkin skin averaged over 10 measurements.

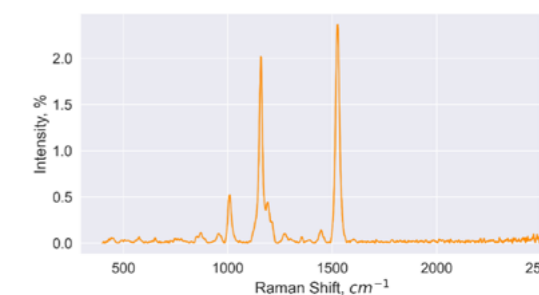


Figure 6. Baseline corrected Raman spectrum of pumpkin skin averaged over 10 measurements.

The Raman spectra of pumpkin skin correspond to the spectra of carotenoids (such as beta-carotene, lutein, and zeaxanthin). These compounds are present in high concentrations and determine orange color of pumpkin.

CONCLUSION

- Pumpkin can be analyzed with miniRaman 785 nm spectrometer
- The lines in the Raman spectra of pumpkin skin correspond to the spectral lines of carotenoid



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