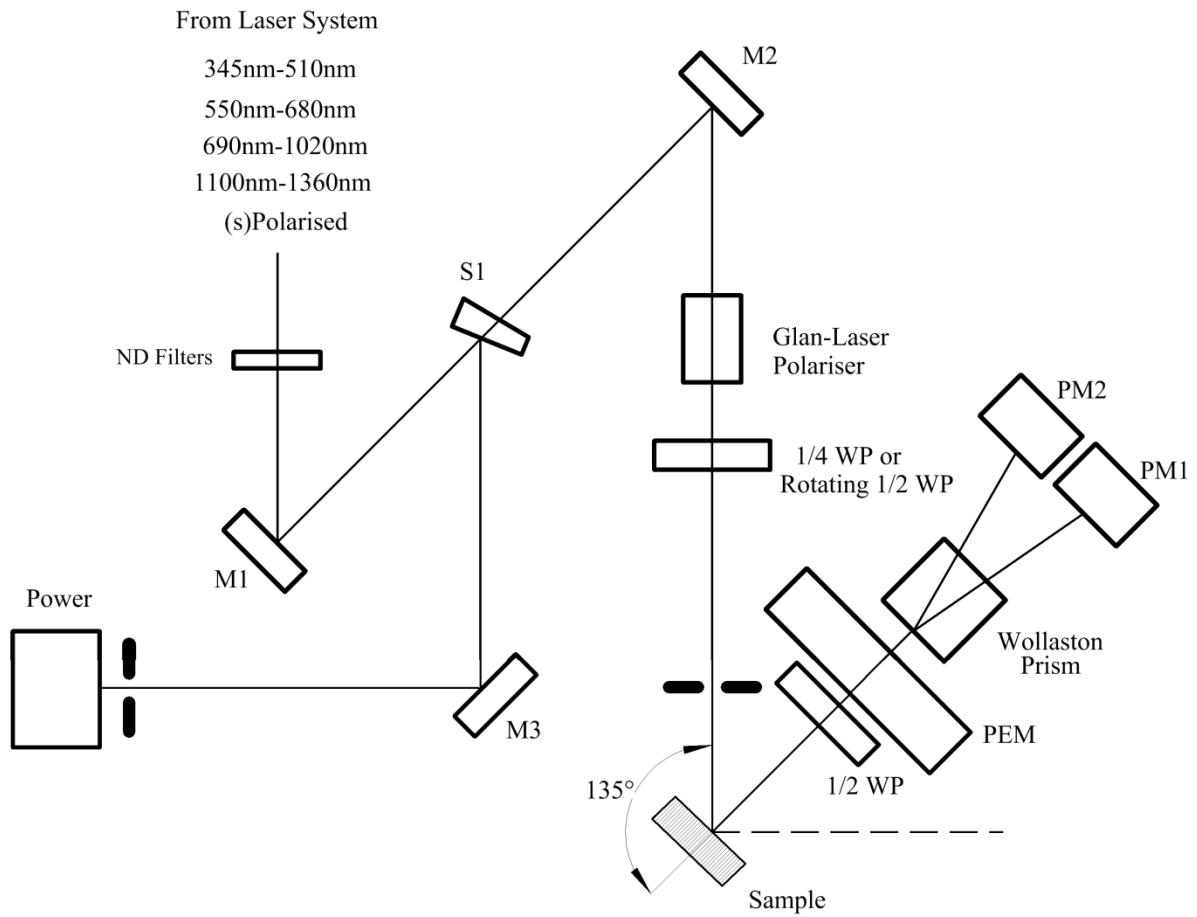


Fig 1. Experiment configuration top view. M1, M2, M3 are protected silver mirrors, S1 is a wedged BK7 beam splitter. The beam height is constant through the optical system.



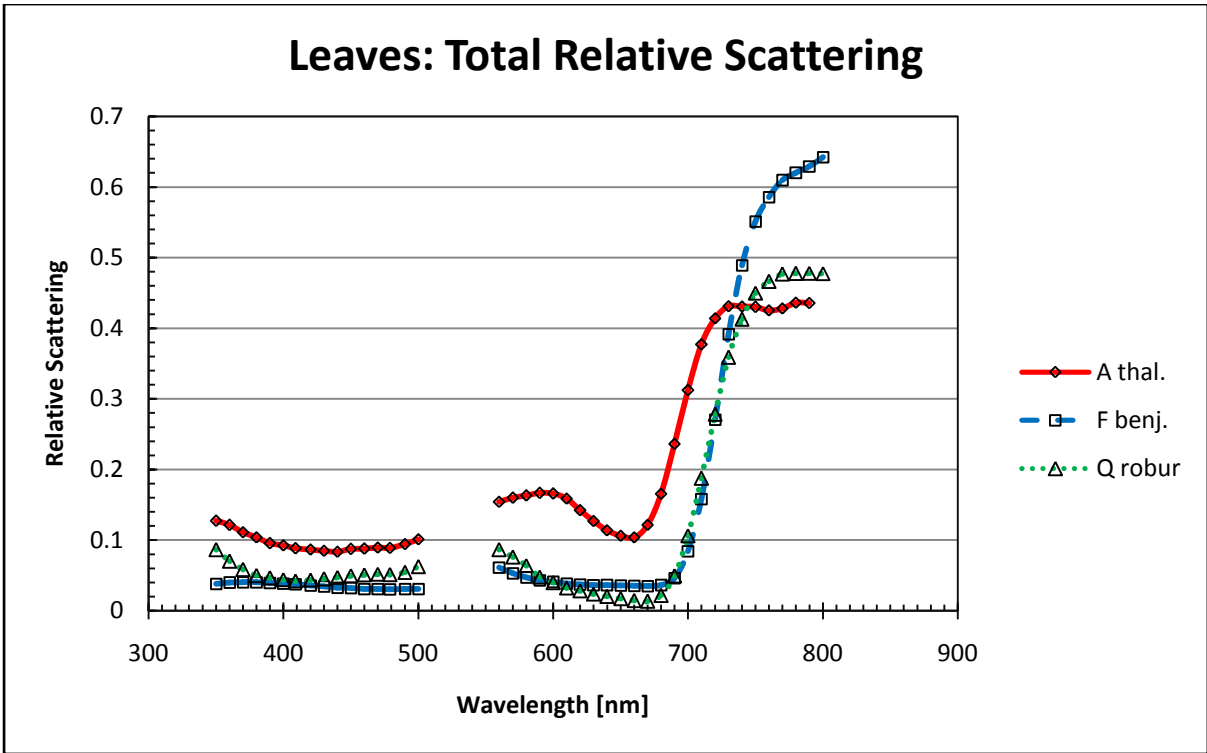


Fig 2. Total scattering relative to Spectralon for three leaf samples

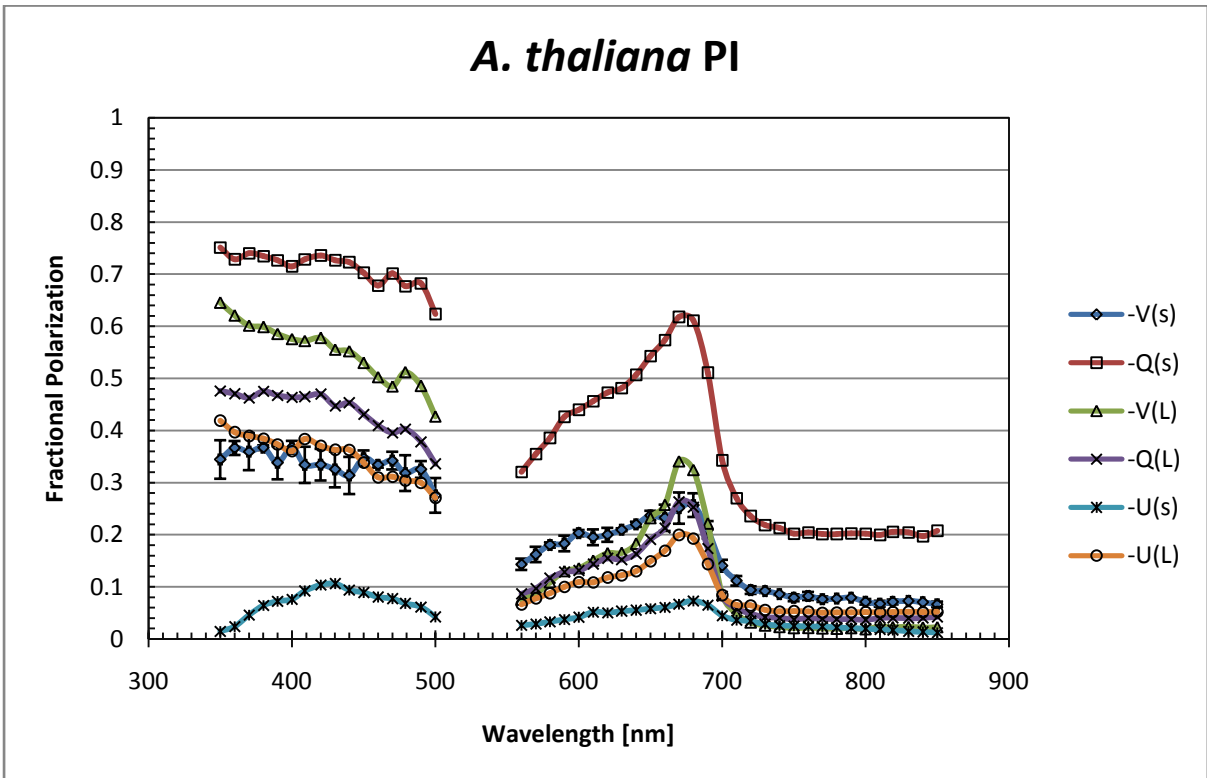


Fig. 3a. Measured scattering from *Arabidopsis thaliana* leaves, magnitudes using the PI technique. Error bars are ± 1 std. See text for the notation. V(R), V(L) are not distinguishable at this scale except for a sign difference.

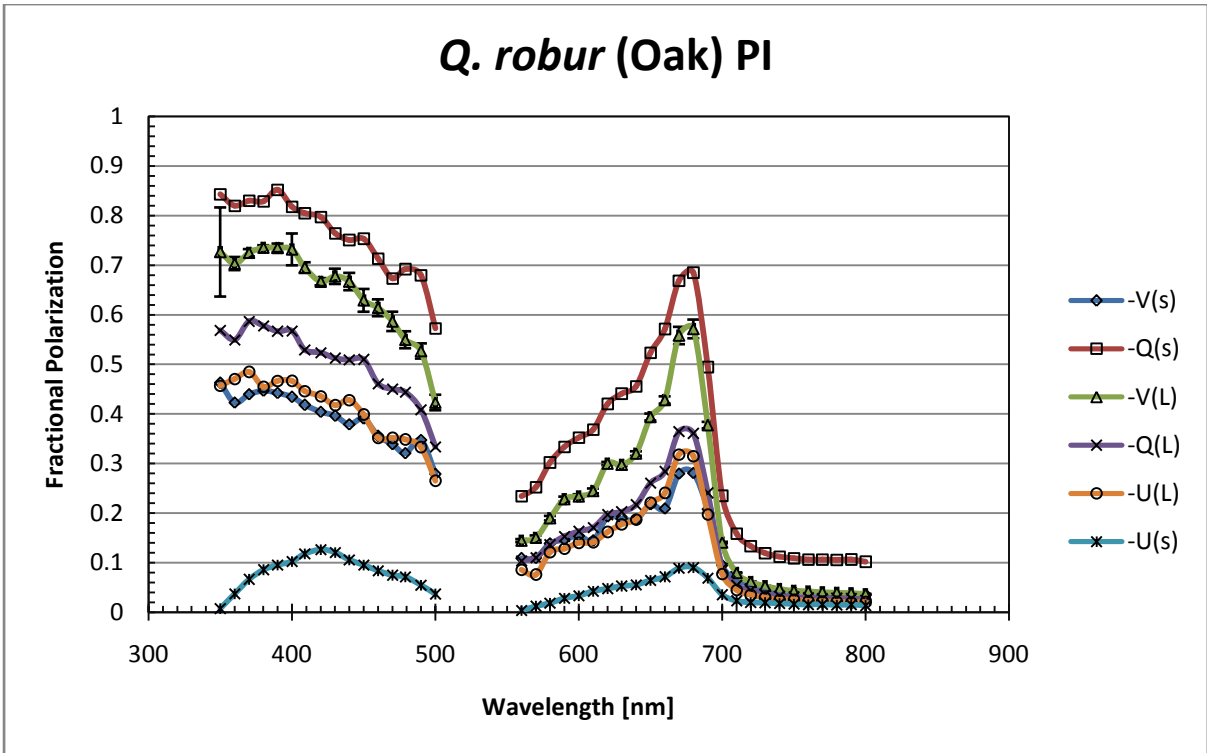


Fig 3b. Measured scattering from English Oak leaves, *Quercus robur*, magnitudes using the PI technique. Error bars are ± 1 std.

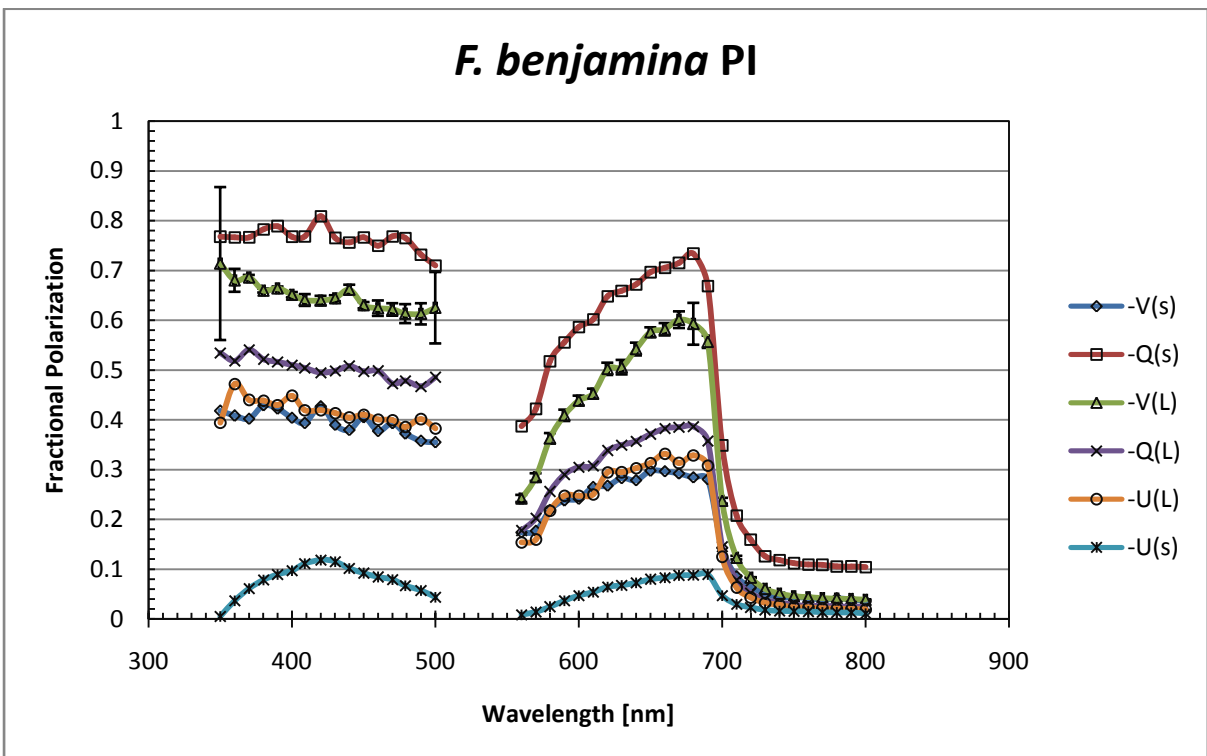


Fig 3c. Measured scattering from *Ficus benjamina* leaves, magnitudes using the PI technique. Error bars are ± 1 std.

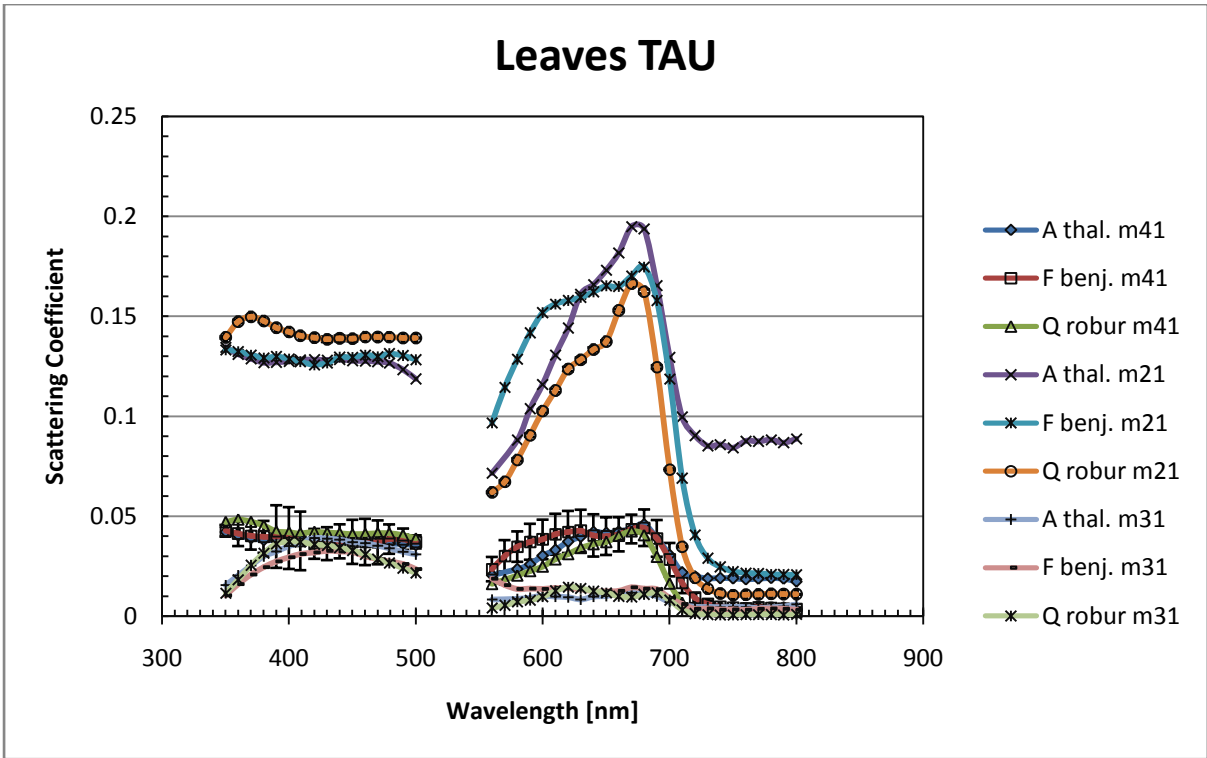


Fig 4. Measured scattering from all leaf samples using the TAU technique. Error bars are ± 1 std.

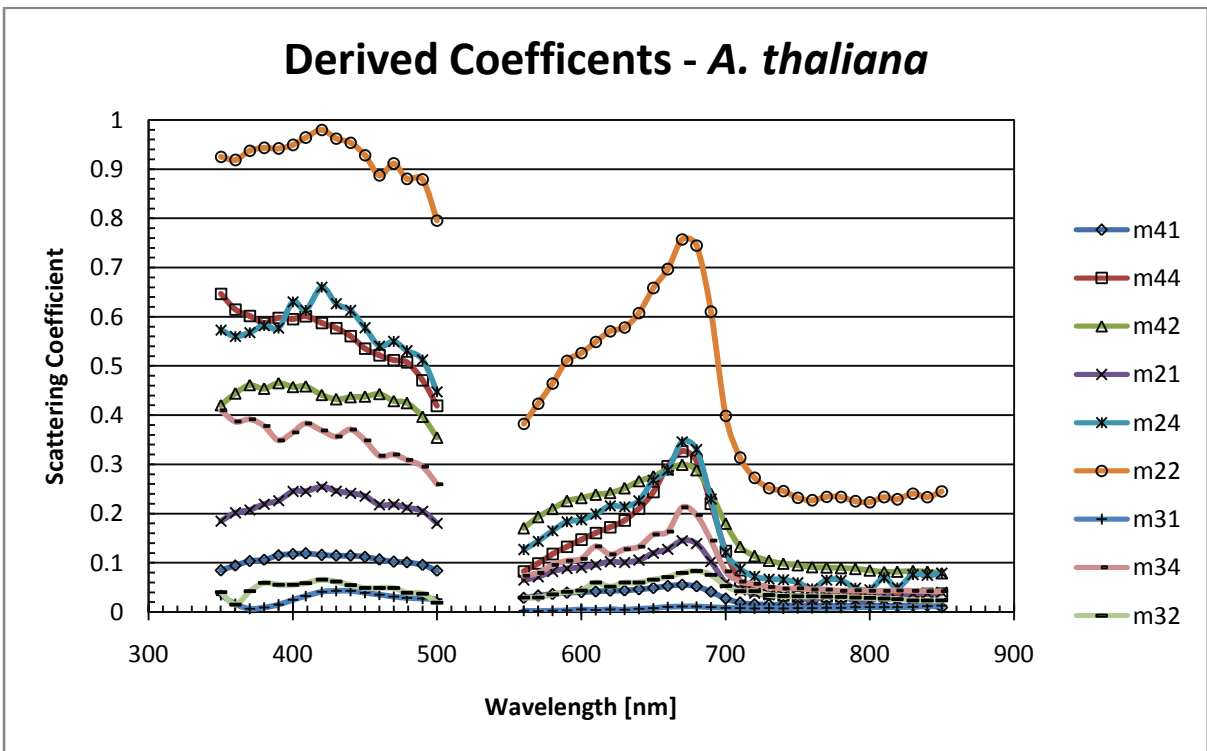


Fig 5. Derived coefficients for *A. Thaliana* using the PI data of Fig 3a, magnitudes only.

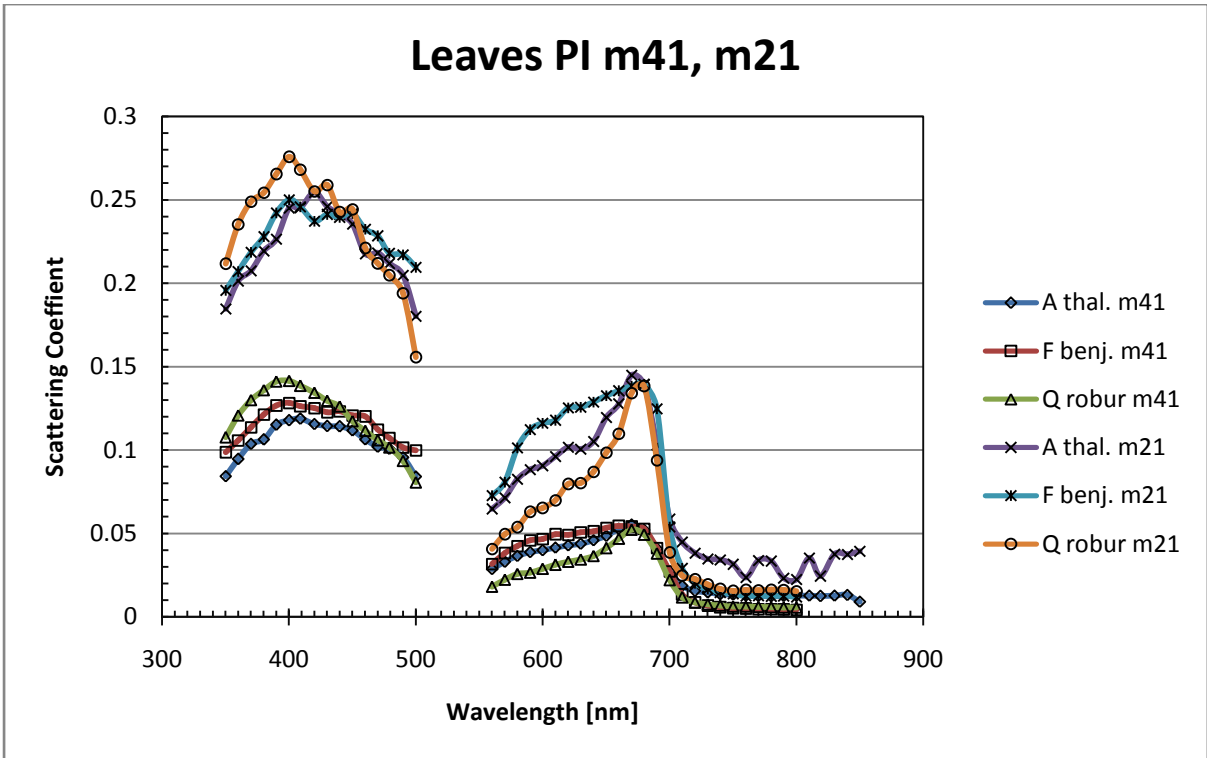
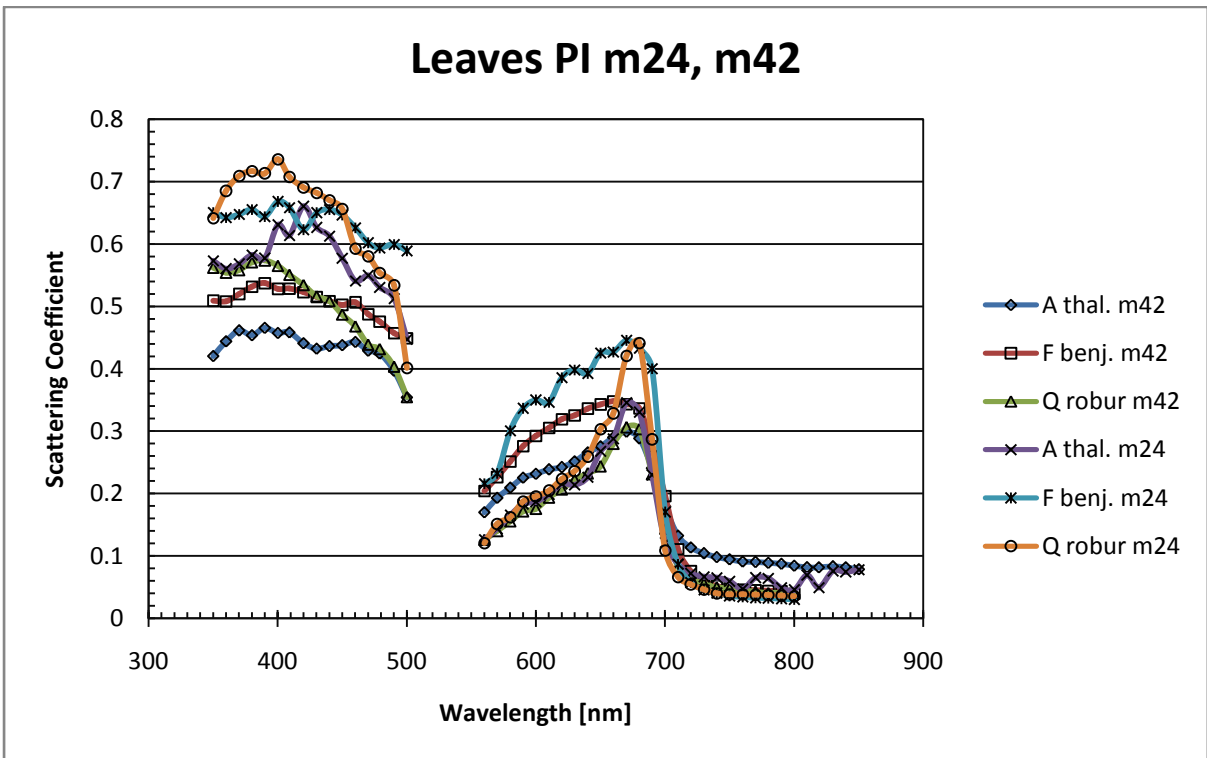


Fig 6a. Derived PI scattering coefficients m_{41} , m_{21} for all leaves. Magnitudes



6b. Derived PI scattering coefficients m_{42} , m_{24} for all leaves. Magnitudes.

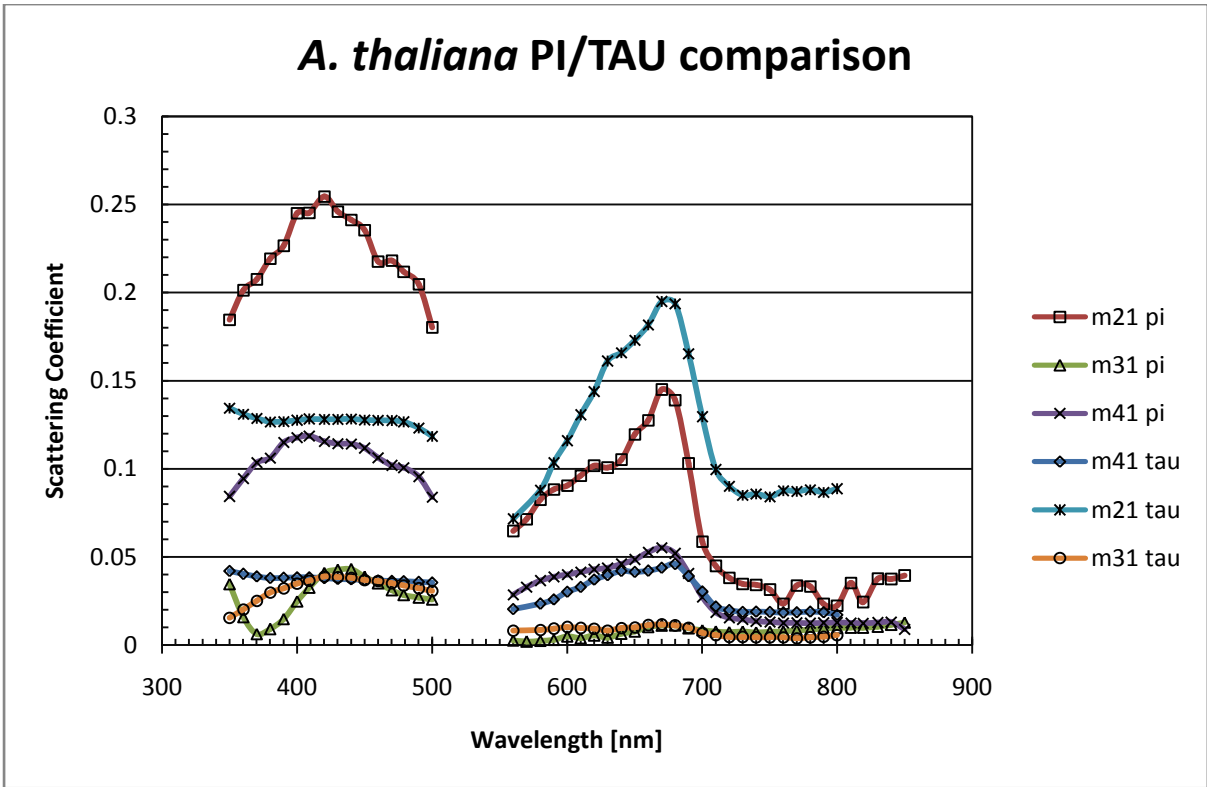


Fig 7. TAU and PI measured coefficients for *A. Thaliana*, different sample for each technique. *Q. robur* (Oak) and *F. benjamina* are similar with the same blue/UV characteristics but show smaller m_{21} values at wavelengths $>700\text{nm}$.

Fig 8. Total scattering with respect to Spectralon for the cyanobacteria and lichen samples.

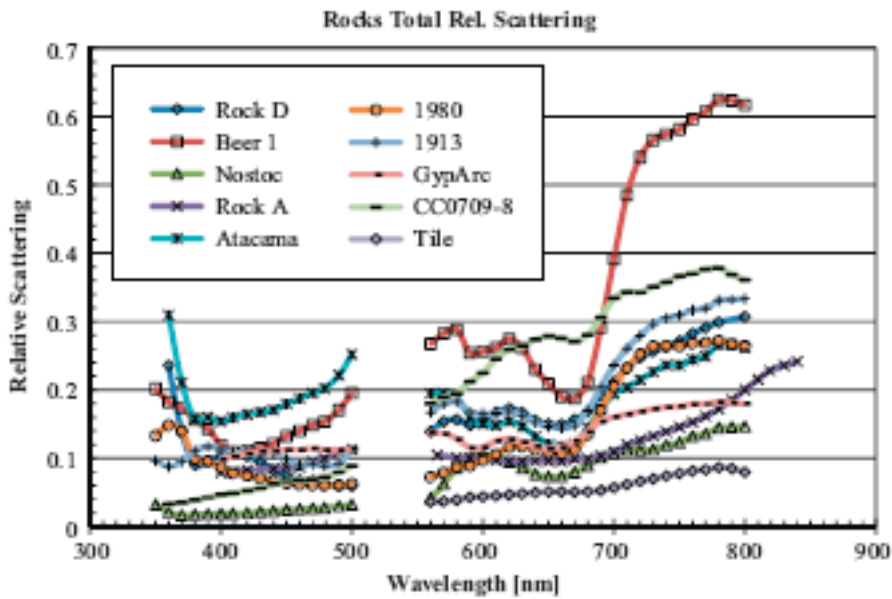


Fig. 8. Total scattering with respect to Spectralon for the cyanobacteria and lichen samples.

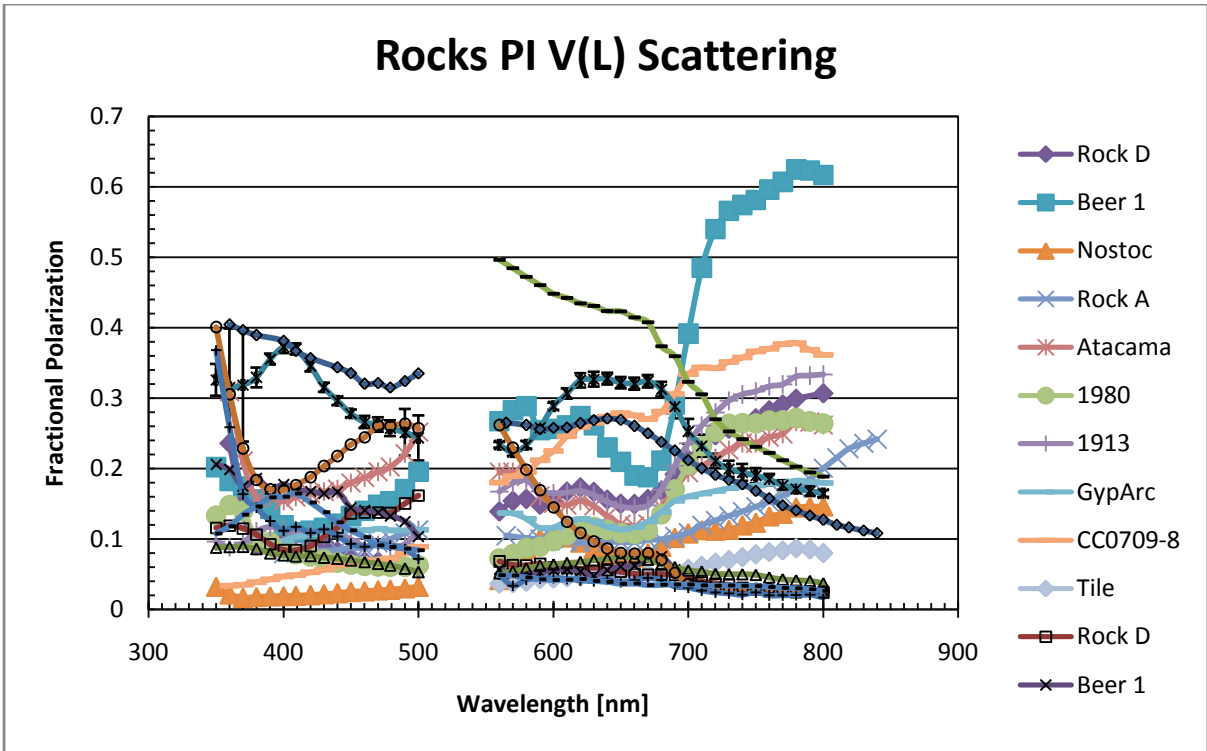


Fig 9. Measured (left circular) PI scattering V(L) for the cyanobacteria and lichen samples. Magnitudes. Error bars are ± 1 std.

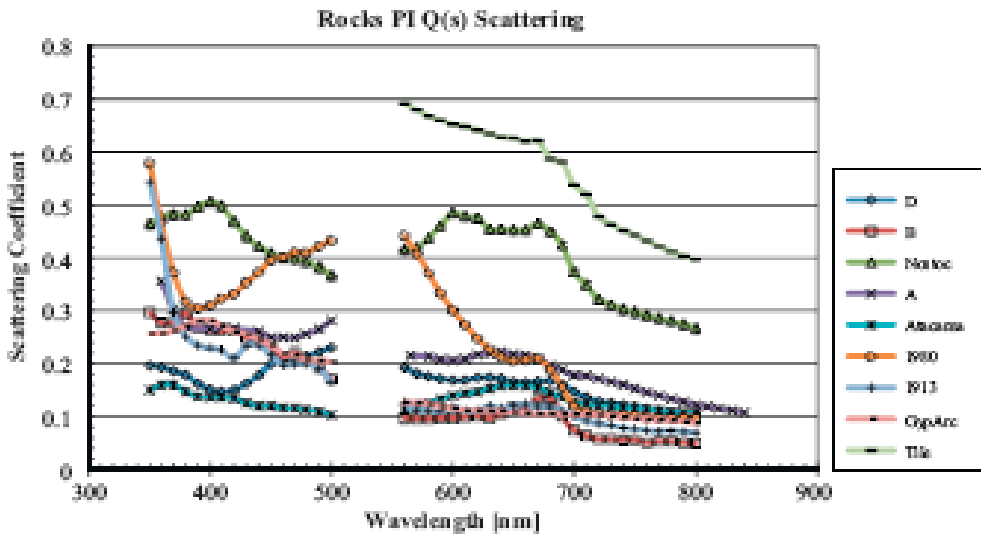


Fig 10. Measured (s) PI scattering Q(s) for the cyanobacteria and lichen samples. Magnitudes. Error bars are ± 1 std.

Fig 10. Measured (s) PI scattering Q(s) for the cyanobacteria and lichen samples. Magnitudes. Error bars are ± 1 std.

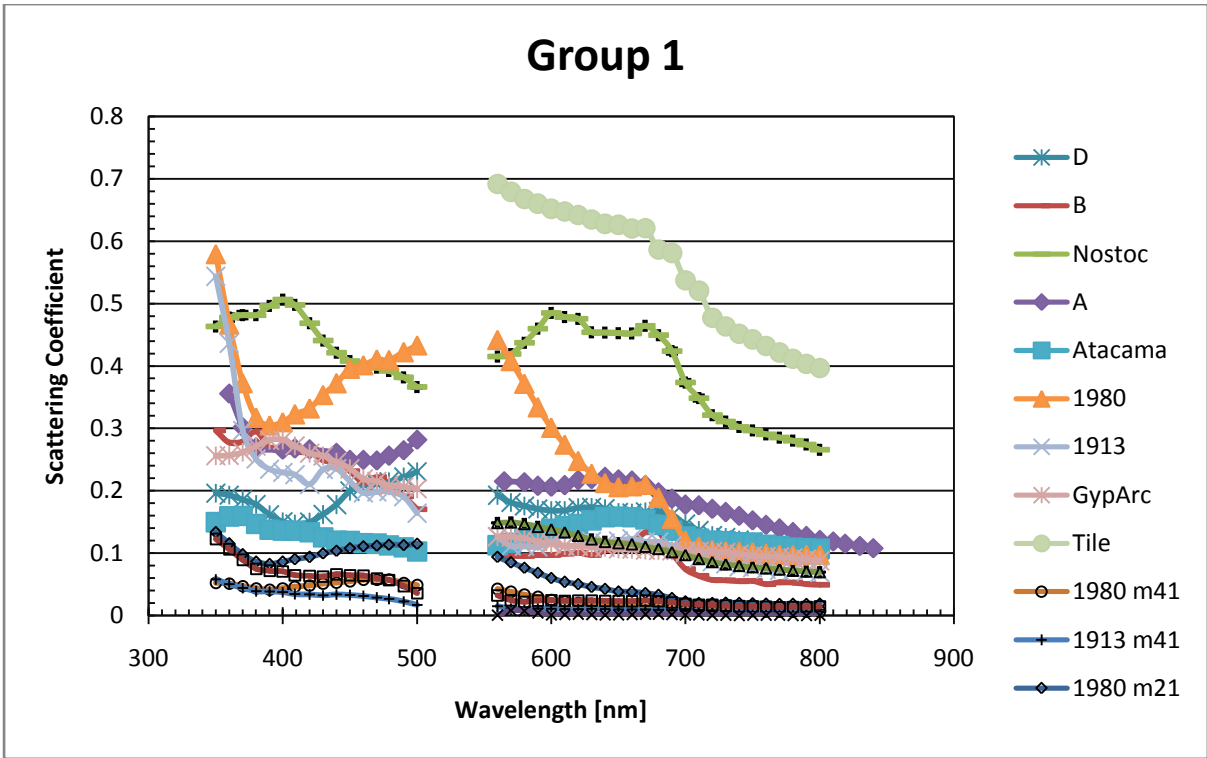


Fig 11. Scattering coefficients m_{41} and m_{21} for samples exhibiting large polarization scattering at $<370\text{nm}$. Error bars are ± 1 std.

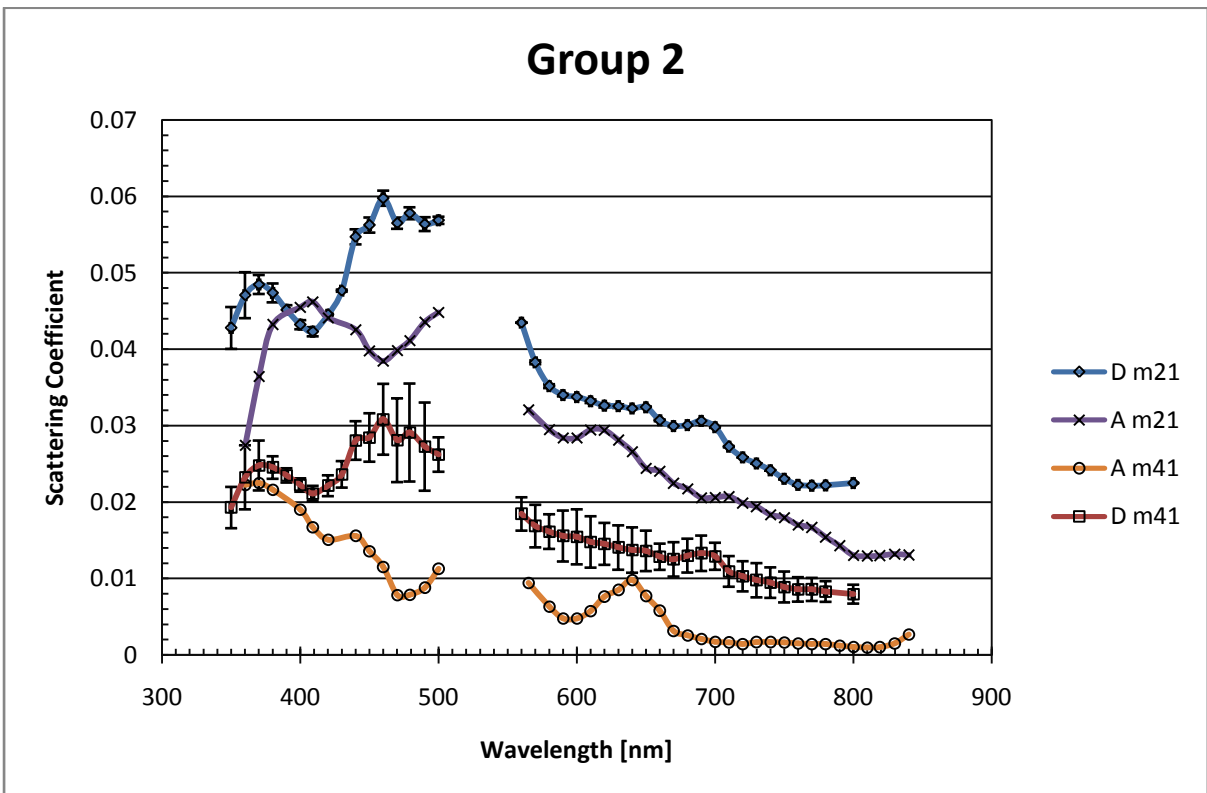


Fig 12. Scattering coefficients m_{41} and m_{21} for samples with multiple scattering peaks and low polarization peaks at $\sim 680\text{nm}$. Error bars are ± 1 std.

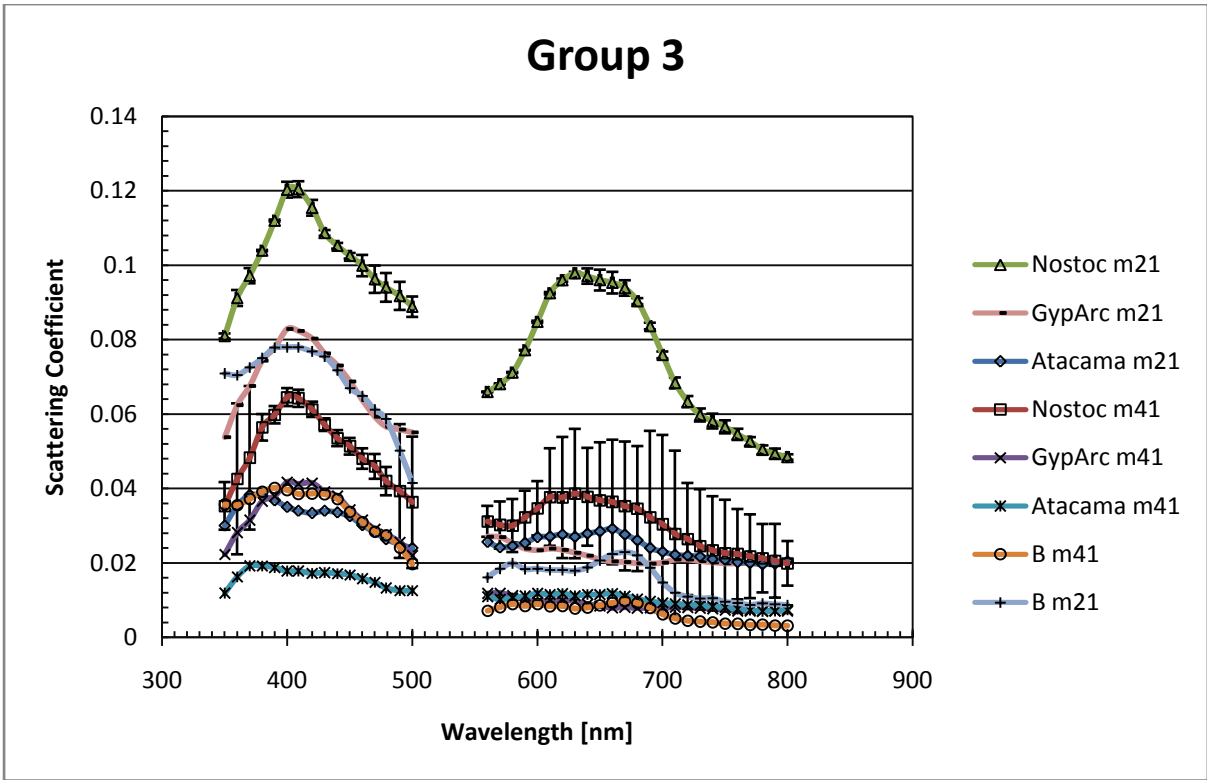


Fig 13. Scattering coefficients m_{41} and m_{21} for samples with broad features from 630-700nm and blue/UV polarization scattering peaks at ~400nm. Error bars are ± 1 std.

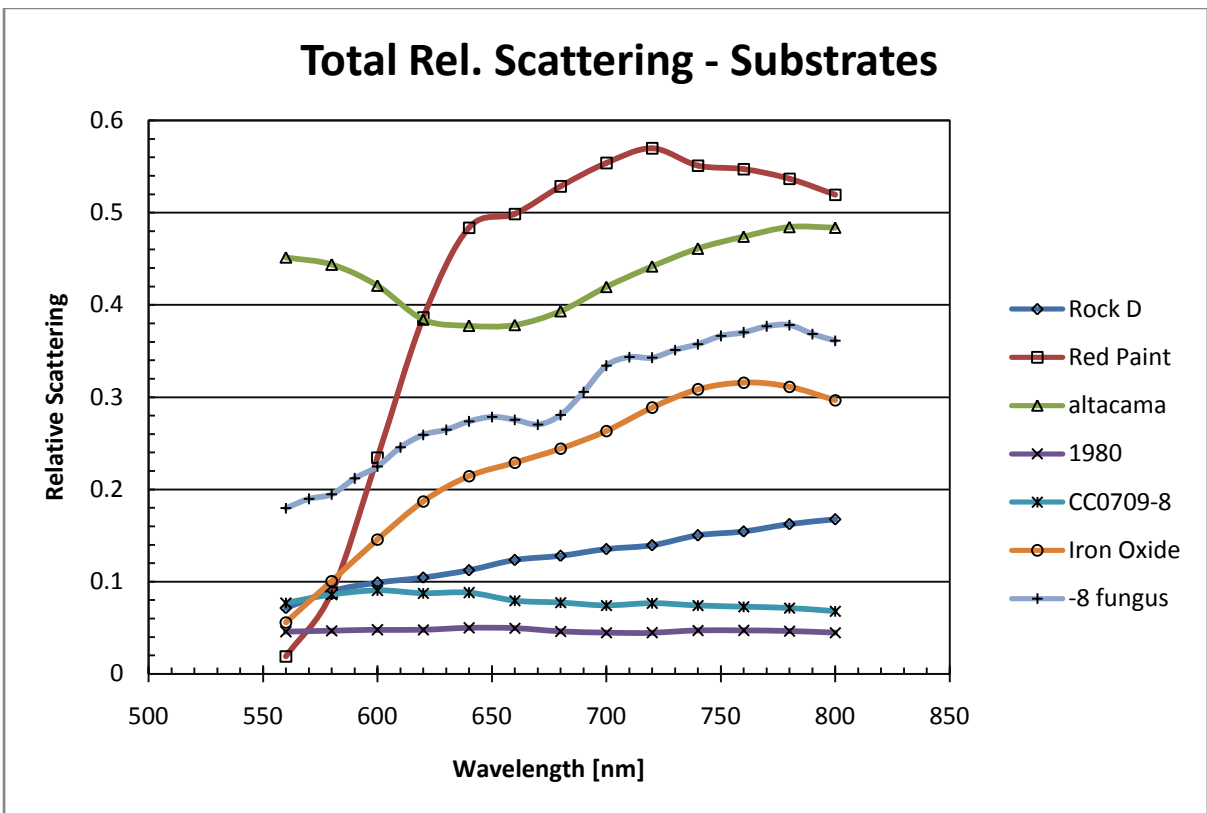


Fig 14. Total scattering relative to Spectralon of substrates and non-biological samples

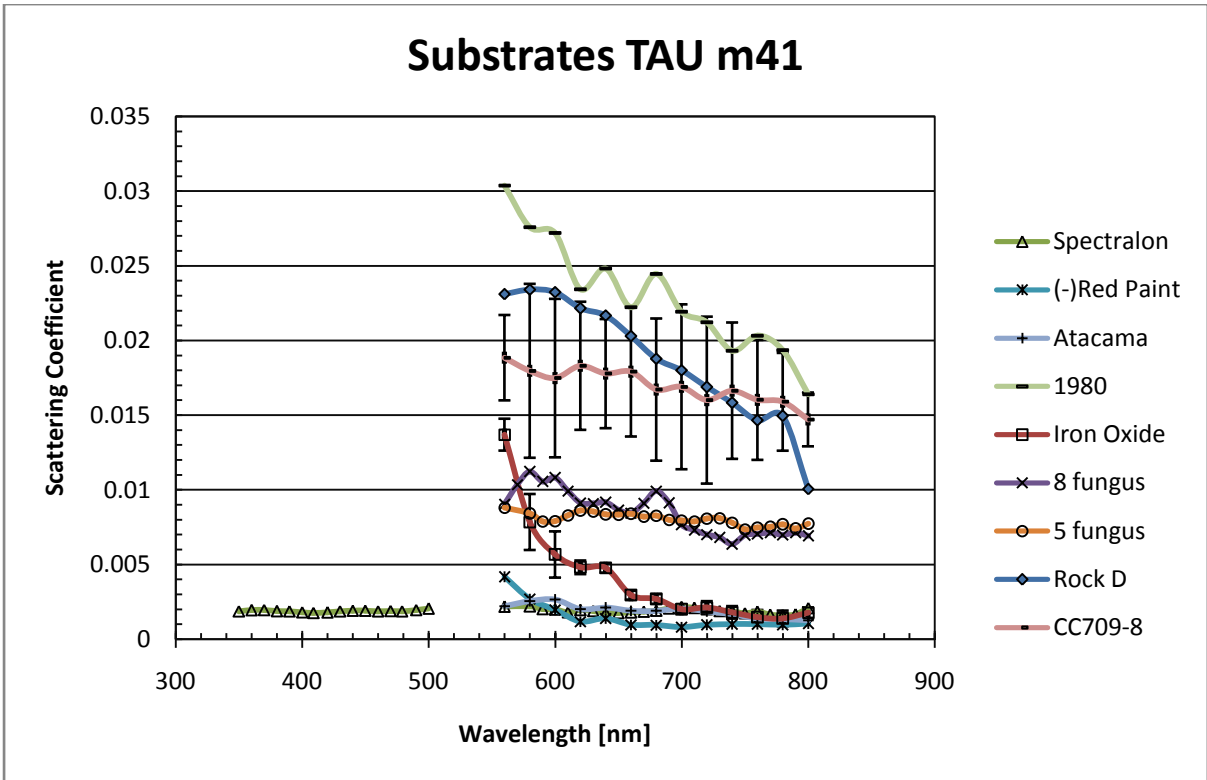


Fig 15. Scattering coefficient m_{41} measured with the TAU technique for substrate and selected lichen samples. Note the sign of the Red Paint sample indicating right elliptical scattering. Error bars are ± 1 std.