

Integrating Sphere Data

(Scenedesmus, Spirulina, Nanno)

Aaron Collins, Howland Jones

Experimental Details

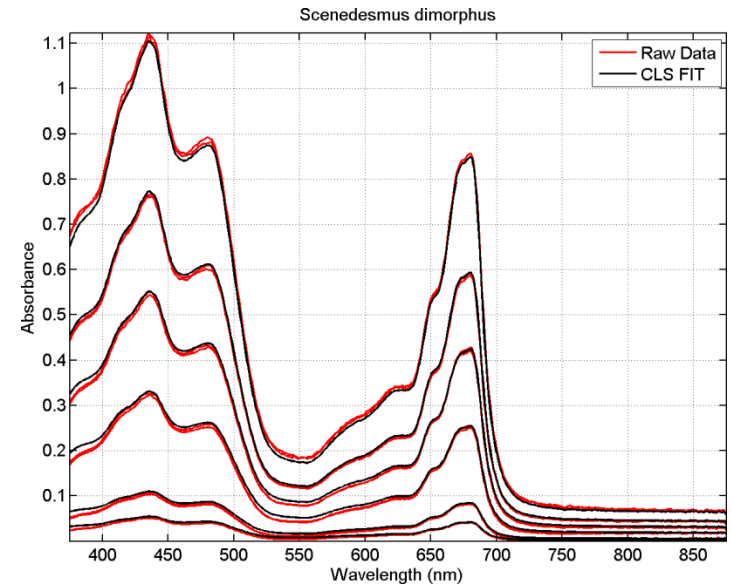
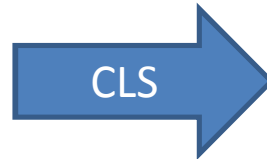
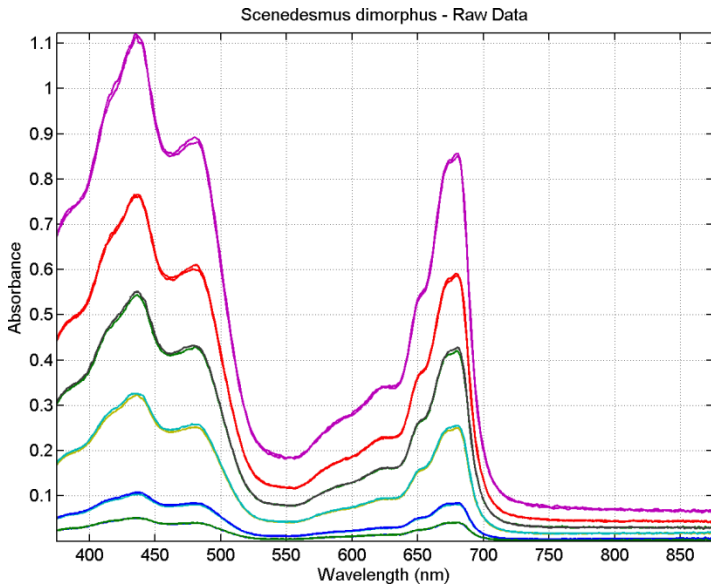
- Scenedesmus, Spirulina, Nannochloropsis culturing conditions
 - Hewson lab light bank used to illuminate PBRs (from Hanson Lab).
 - Spirulina media, F/2 media and MASM media used.
 - No additional carbon in the media
 - Lab air (80 ppm CO₂) was mixed with ~1% CO₂ to mix and feed cultures
- Dried cell weights were measured for Scenedesmus and Spirulina
 - 50 ml of Cells were vacuum filtered over a Whatman 50 filter paper that was pre-weighed
 - Cells were washed with 25 ml of 0.5M ammonium bicarbonate
 - Filters were dried at 90 C for 6 hours and then cooled to room temperature under vacuum desiccation
 - Filter paper was weighed and the DCW determined
 - Nannochloropsis passed through the filter, so we only have cell counts
- Integrating Sphere measurements
 - Perkin Elmer LAMBDA (dual beam) with 60 mm integrating sphere attachment. Sample was stirred in 1cm cuvette by home-made stirring mechanism.

Analysis Details

- Used CLS to obtain a pure spectral component that was associated with the corresponding concentrations of algae
- Absorptivity was calculated from the pure spectral component by dividing the effective pathlength (1 cm)
 - Essentially the pure component is the absorptivity

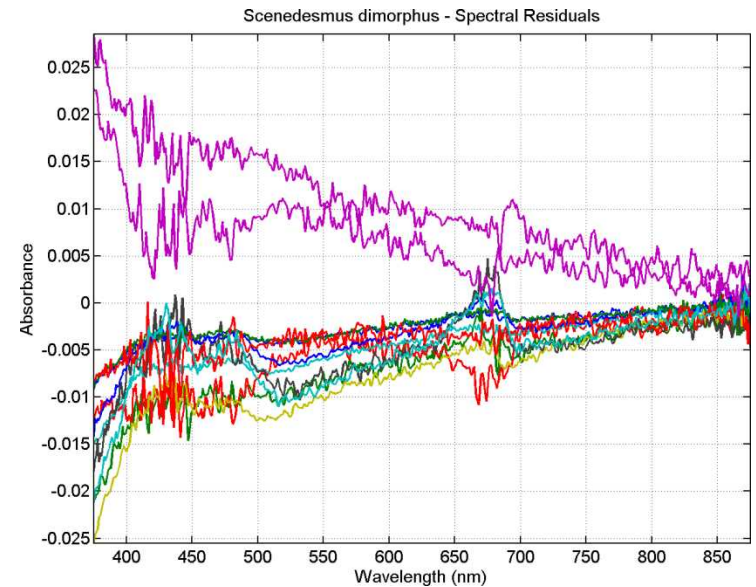
Results

Scenedesmus dimorphus

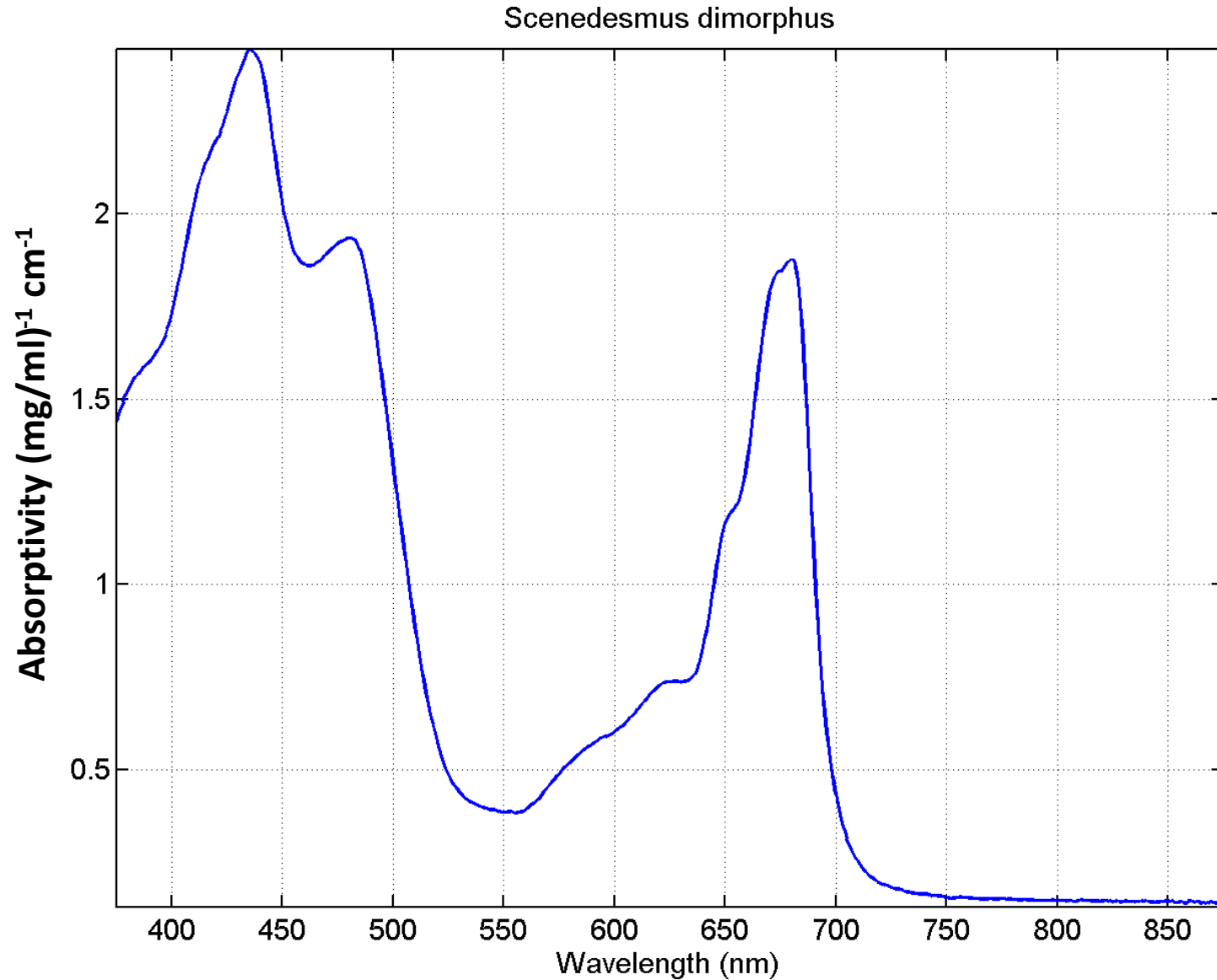


Refers to the random order in which the samples were analyzed

RunOrder	DCW (mg/ml)
1	0.0226
2	0.226
3	0.3164
4	0.0452
5	0.452
6	0.1356
7	0.226
8	0.0452
9	0.0226
10	0.3164
11	0.1356
12	0.452

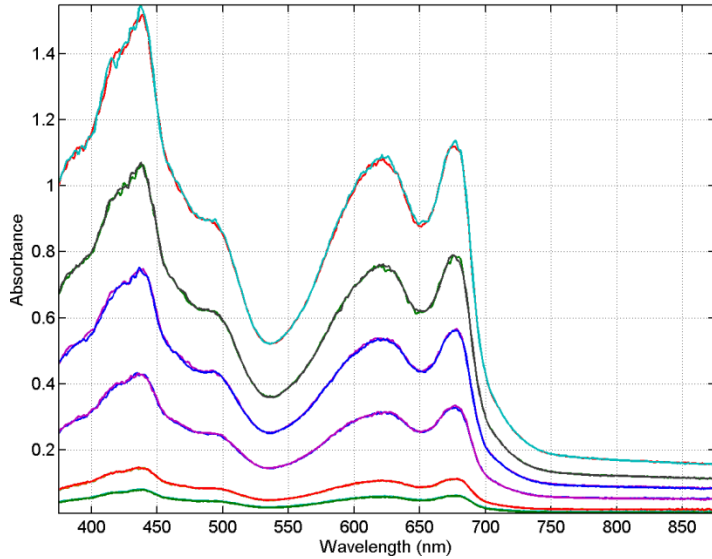


Scenedesmus dimorphus



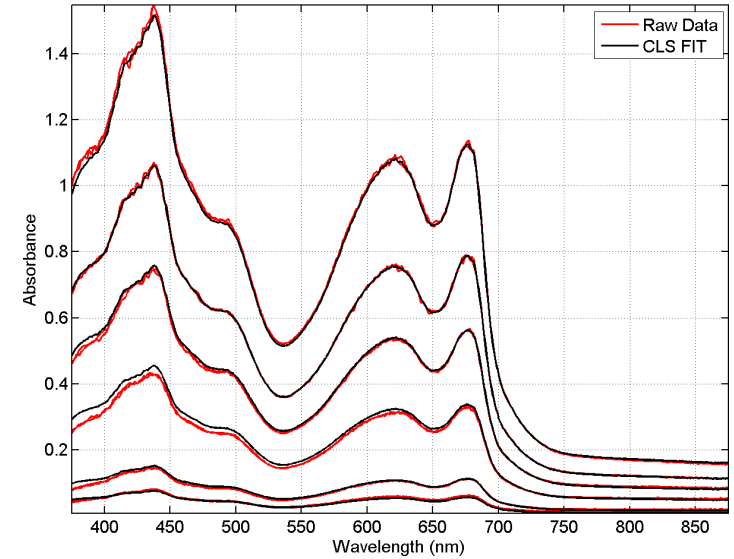
Spirulina platensis

Spirulina platensis - Raw Data



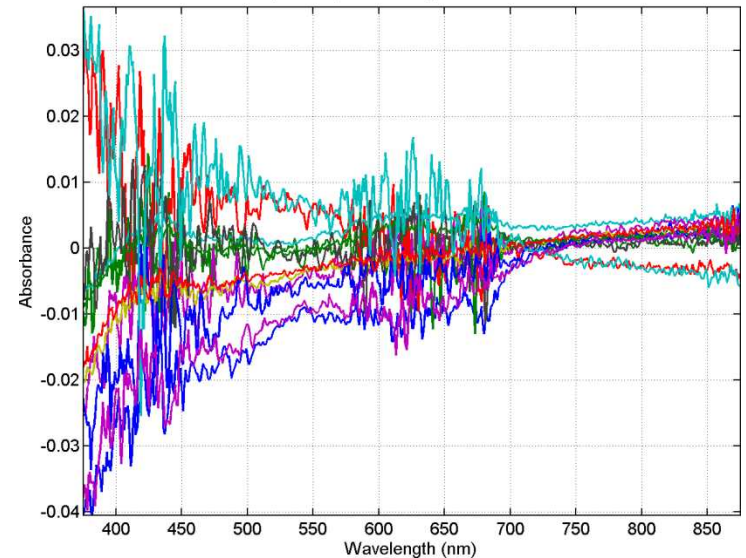
CLS

Spirulina platensis

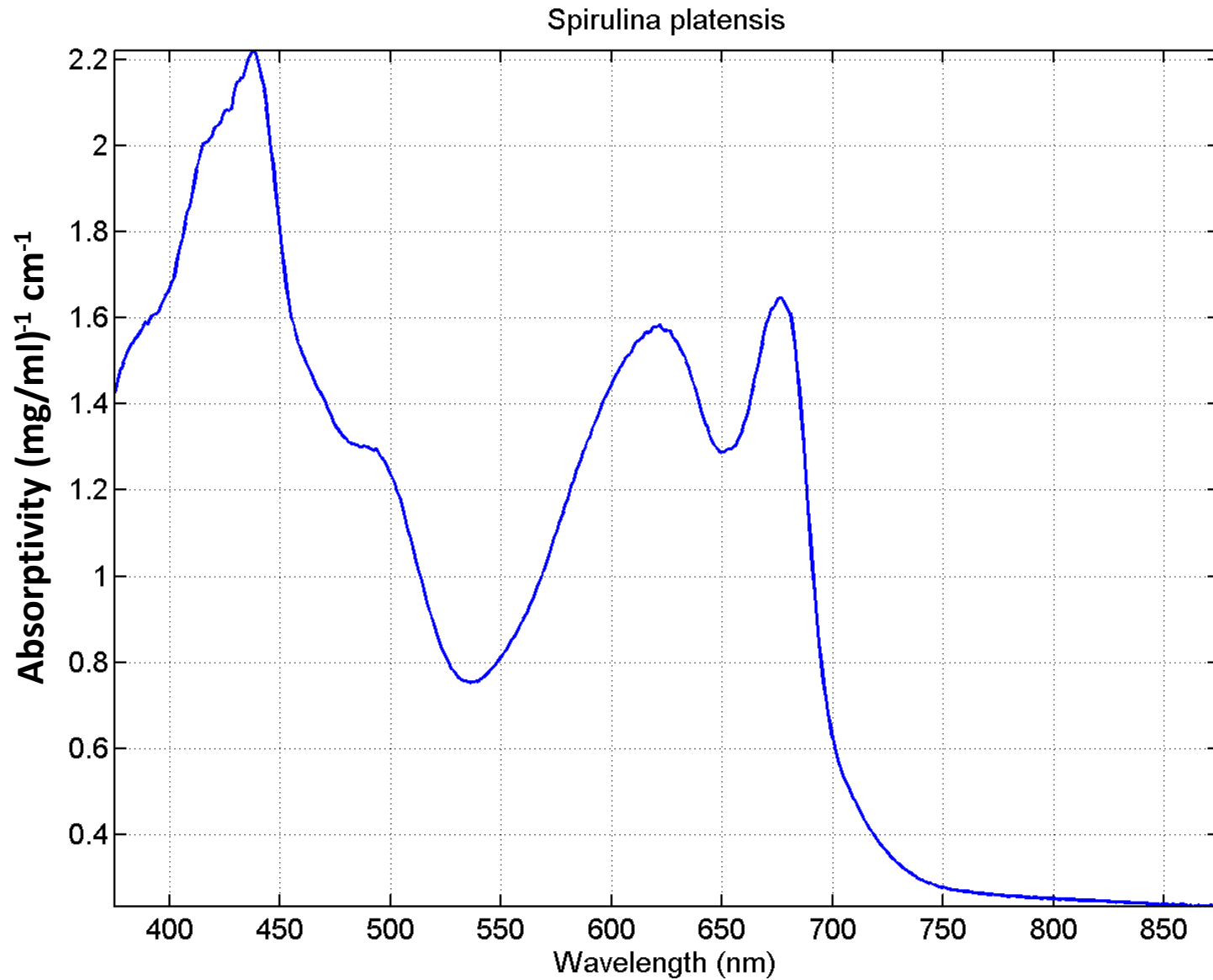


RunOrder	DCW (mg/ml)
1	0.2049999
2	0.4783331
3	0.683333
4	0.03416665
5	0.3416665
6	0.0683333
7	0.4783331
8	0.3416665
9	0.03416665
10	0.0683333
11	0.683333
12	0.2049999

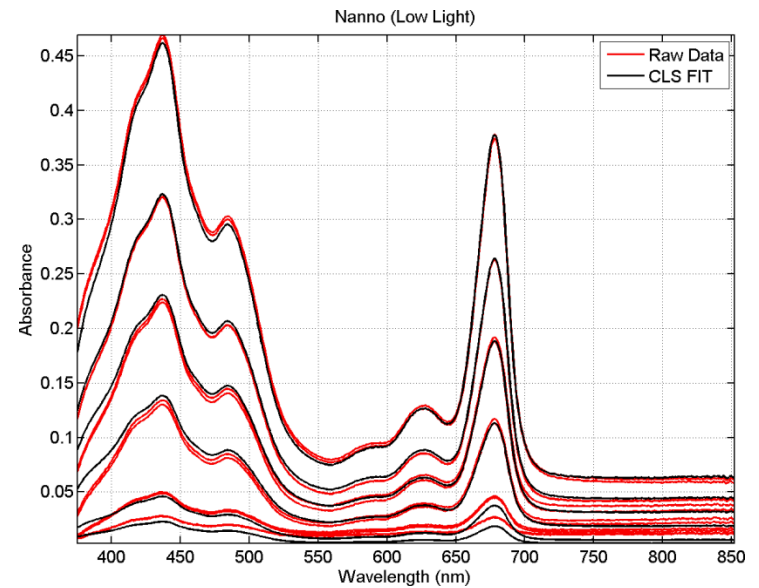
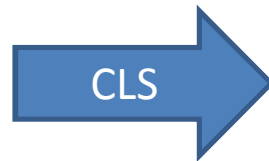
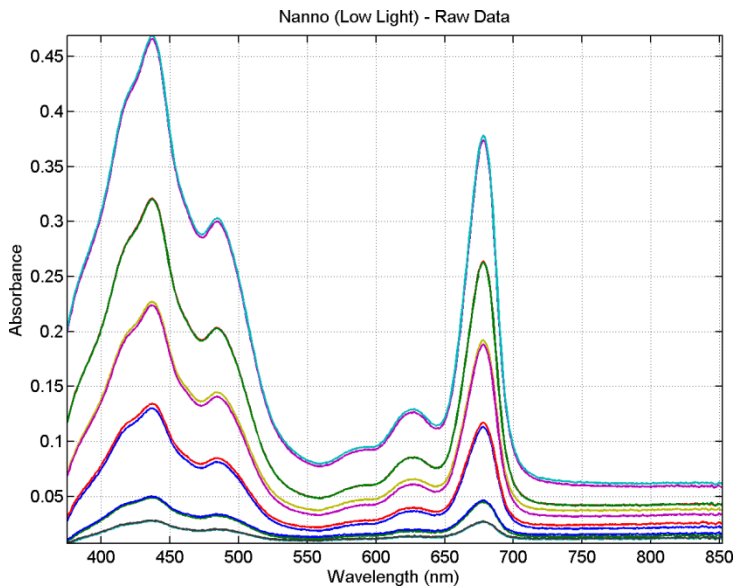
Spirulina platensis - Spectral Residuals



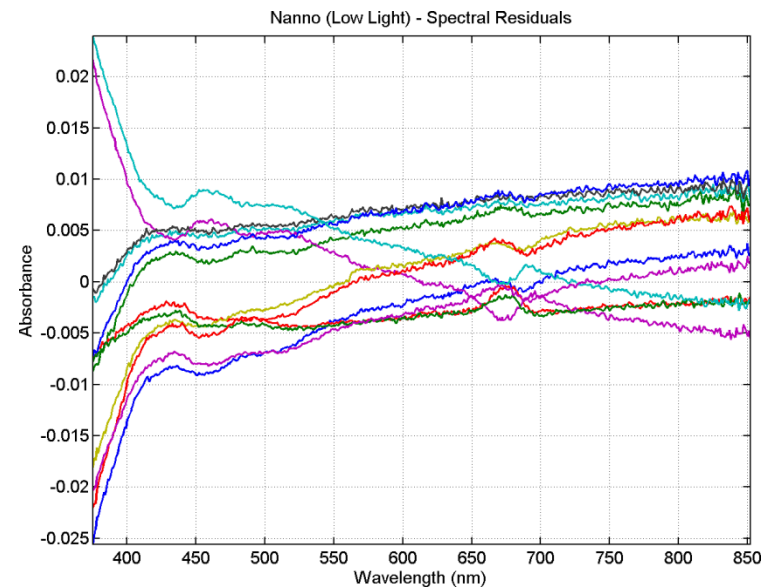
Spirulina platensis



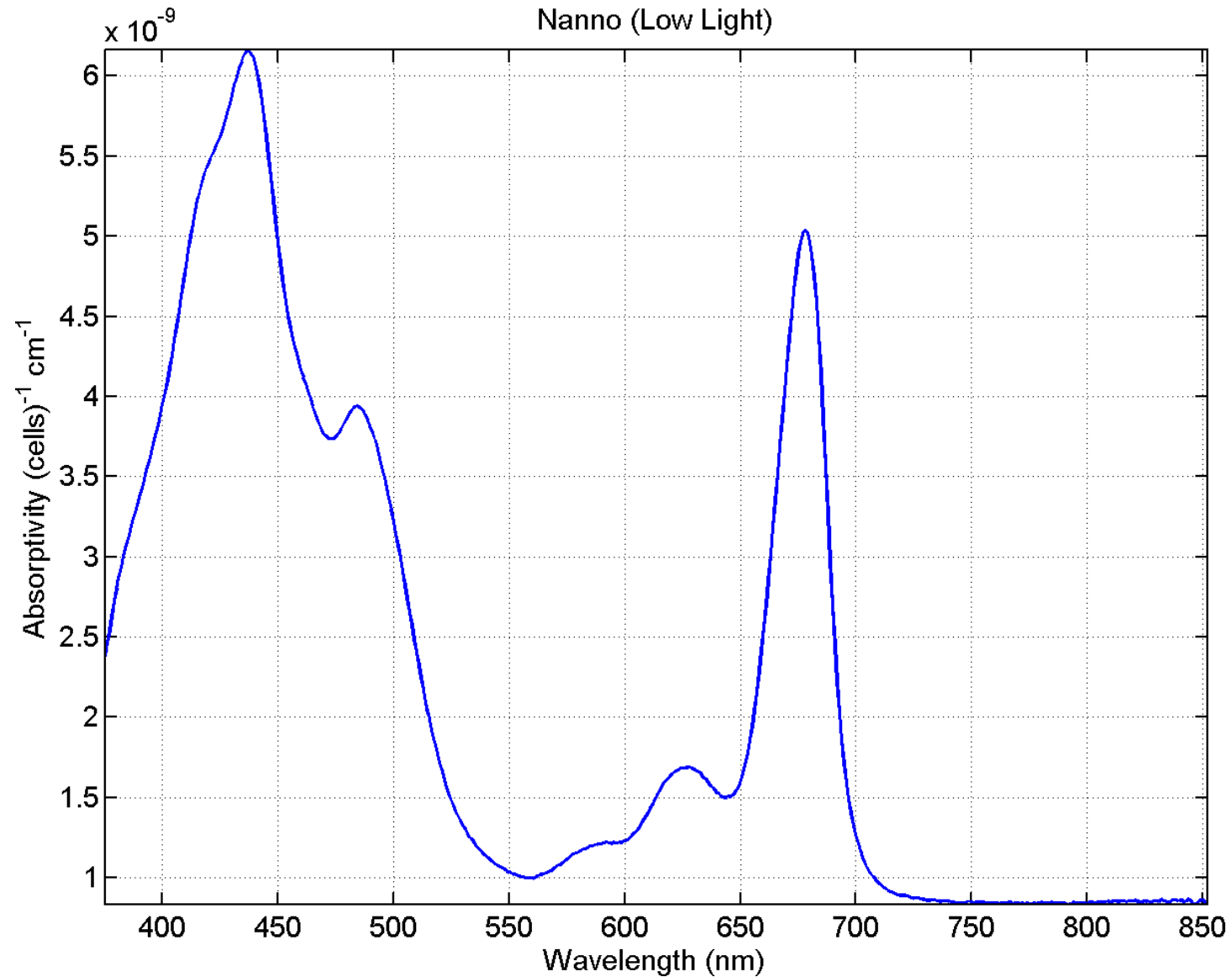
Nannochloropsis (Low Light)



RunOrder	# Cells
1	22500000
2	7500000
3	52500000
4	3750000
5	75000000
6	37500000
7	3750000
8	7500000
9	52500000
10	22500000
11	75000000
12	37500000

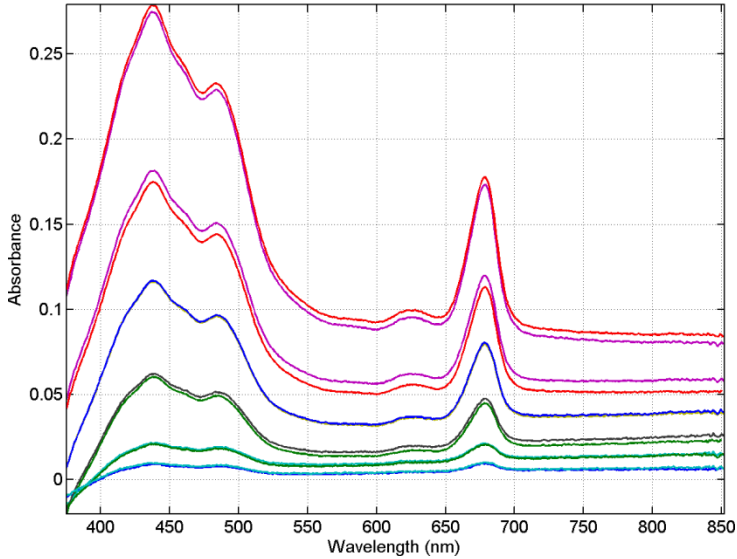


Nannochloropsis (Low Light)



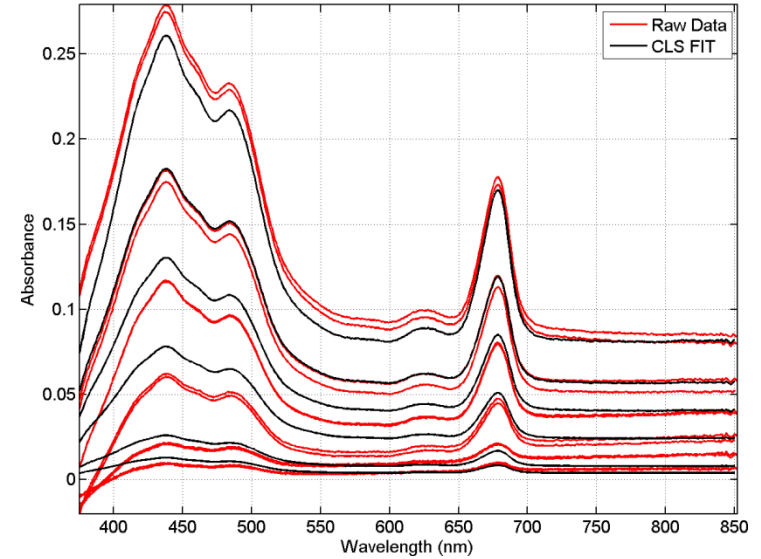
Nannochloropsis (High Light)

Nanno (High Light) - Raw Data



CLS

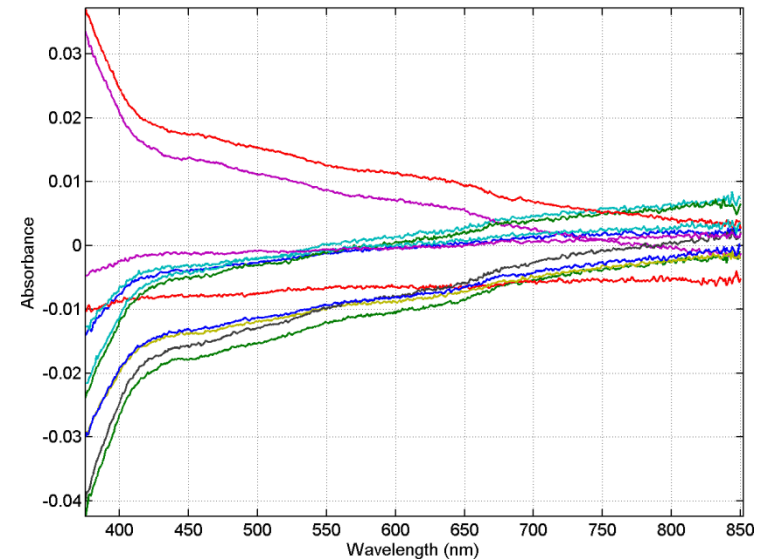
Nanno (High Light)



RunOrder	# Cells
1	9500000
2	57000000
3	1.33E+08
4	19000000
5	1.9E+08
6	95000000
7	57000000
8	95000000
9	19000000
10	1.9E+08
11	9500000
12	1.33E+08

Not a very good fit
of the data!

Nanno (High Light) - Spectral Residuals



Nannochloropsis (High Light)

