

Appendix F

Table F.7. Cd column volatile solids (VS) data for Figure 5.38.

Location	Time (days)	Average VS/ dry sand (mg/g)	s of duplicate	Time (days)	Average VS/ dry sand (mg/g)	s of duplicate	Time (days)	Average VS/ dry sand (mg/g)	s of duplicate	Time (days)	Average VS/ dry sand (mg/g)	s of duplicate
Inf												
F1	53	0.637465	#DIV/0!	113	4.0206732	0.617982	135	2.240963	0.39492	149	1.929416	1.72846
F2		1.820963	#DIV/0!		2.6974483	0.56445		1.163519	#DIV/0!		2.638788	1.06911
F3		2.517938	2.124787		3.7367104	0.622113		1.754889	0.016507		2.94651	1.52189
F4		2.252077	1.373291		3.5912458	0.614233		2.220344	0.121611		2.239231	0.29727
Eff												

Location	Time (days)	Average VS/ dry sand (mg/g)	s of duplicate	Time (days)	Average VS/ dry sand (mg/g)	s of duplicate	Time (days)	Average VS/ dry sand (mg/g)	s of duplicate	Time (days)	Average VS/ dry sand (mg/g)	s of duplicate
Inf												
F1	170	2.459987	0.682953	191	3.072051	0.066399	275	4.146717	0.732572	276	2.27931	0.04083
F2		2.492435	0.801334		1.8552872	0.753892		3.445936	2.132103		1.575281	0.39681
F3		3.670245	1.575522		3.7619623	0.392645		3.080873	0.755231		1.147197	0.2541
F4		2.978328	0.131021		3.1176859	0.815138		1.969032	0.245345		1.380203	0.00551
Eff												

Calculations

s = standard deviation of triplicate analysis

where

$x_i$  = single value

$\bar{x}$  = average of values

n = number of observations

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

## Appendix F

Table F7a-h. Volatile solids (VS) calculations used on raw data.

### Calculations:

**Volatile Solids (VS) = total biomass weight (g)**

$$VS = D - C$$

where

D = weight of pan + sand after 20 min. at 550°C (g)

C = weight of pan + sand after 1 hr at 100°C (g)

**Dry Sand Weight**

$$E = D - A$$

where

A = weight of pre-burned pan (g)

**Biomass Concentration (mg biomass/ g dry sand):**

$$\text{Biomass} = \frac{(D - A)}{E} * 1000$$

where

E = dry sand mass (g)

1000 = conversion factor (1000 mg = 1 g)

**Fraction of Dry sand:**

$$J = 1 - \frac{(B - C)}{(B - A)}$$

where

J = fraction of dry sand (decimal)

B = Pan + wet sand mass (g)

**Standard deviation in dry sand fraction:**

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

where

$x_i$  = single value

$\bar{x}$  = average of values

n = number of observations

**Note: Fraction dry sand and s of dry sand were used to determine protein and carbohydrates concentrations per dry sand mass.**

Appendix F Table F.7a. Cd flowcell volatile solids (VS) raw data (day 53).

Sample Name	A	B	C	D	E	VS	G	H	J
	Pan Weight (g)	Pan + Sand wt (g)	Wt after 100 C (g)	VS, Wt after 550 C (g)	Dry Sand Wt (g)	Volatile Solids Wt (g)	Biomass wt/dry sand wt (mg/g)	Fraction water in sand sample	Fraction dry sand
day 53	F1a	0.9919	2.285	2.0907	2.09	1.0981	0.0007	0.150259	0.849741
	F1b	0.9913	2.404	2.2096	2.2106	1.2193	-0.001	0.137609	0.862391
	F2a	0.9921	2.2915	2.0884	2.0897	1.0976	-0.0013	0.156303	0.843697
	F2b	0.9906	2.5775	2.366	2.3635	1.3729	0.0025	1.820963	0.133279
	F3a	0.9893	2.629	2.3878	2.3822	1.3929	0.0056	4.020389	0.1471
	F3b	0.9889	2.8062	2.5661	2.5645	1.5756	0.0016	1.015486	0.132119
	F4a	0.9869	2.3774	2.2008	2.1969	1.21	0.0039	3.22314	0.127005
	F4b	0.99	2.6702	2.4751	2.4732	1.4832	0.0019	1.281014	0.116117

Location	Average VS/ dry sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
day 53	1	#DIV/0!	0.856066	0.0089451
	2	#DIV/0!	0.855209	0.0162806
	3	2.12	0.86039	0.0105932
	4	1.37	0.878439	0.0076987

Appendix F Table F7b. flowcell volatile solids (VS) raw data (day 113).

Sample Name	Pan Weight (g)	Pan + Sand wt (g)	Wt after 100 C (g)	Wt after 550 C (g)	Dry Sand Wt (g)	Volatile Solids Wt (g)	Biomass wt/dry sand wt (mg/g)	Fraction water in sand sample	Fraction dry sand
Cd day 113	F1a	1.9619	1.923	1.9188	0.9422	0.0042	4.457652	0.03948	0.96052
	F1b	1.6502	1.6502	1.6478	0.6697	0.0024	3.583694		
	F2a	1.8666	1.8486	1.8466	0.8702	0.002	2.298322	0.02022	0.97978
	F2b	2.0393	2.0151	2.0119	1.0334	0.0032	3.096574	0.022813	0.977187
	F3a	2.0578	2.0168	2.0134	1.0313	0.0034	3.29681	0.038115	0.961885
	F3b	2.2235	2.1641	2.1592	1.1732	0.0049	4.176611	0.048	0.952
	F4a	2.2964	2.2523	2.2472	1.2669	0.0051	4.025574	0.033508	0.966492
	F4b	2.0915	2.0655	2.0621	1.077	0.0034	3.156917	0.0235	0.9765

Location	Average VS/ dry sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
1	4.02	0.62	0.96052	#DIV/0!
2	2.70	0.56	0.978483	0.0018334
3	3.74	0.62	0.956943	0.00699

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Table F7c. Cd flowcell volatile solids (VS) raw data (day 135).

Sample Name	Pan Weight (g)	Pan + Sand wt (g)	Wt after 100 C (g)	Wt after 550 C (g)	Dry Sand Wt (g)	Volatile Solids Wt (g)	Biomass wt/dry sand wt (mg/g)	Fraction water in sand sample	Fraction dry sand
Cd day 135	F1a	0.9767	2.4579	2.455	1.4783	0.0029	1.961713	0.023535	0.976465
	F1b	0.9784	1.9331	1.9307	0.9523	0.0024	2.520214	0.002508	0.997492
	F2a	0.9768	1.878	1.7985	0.8217	0.0795		0.085355	0.914645
	F2b	0.9787	2.0973	2.096	1.1173	0.0013	1.163519	0.019202	0.980798
	F3a	0.982	2.3037	2.3014	1.3194	0.0023	1.743217	0.052205	0.947795
	F3b	0.9868	2.5746	2.5718	1.585	0.0028	1.766562	0.054712	0.945288
	F4a	0.9805	1.8726	1.8707	0.8902	0.0019	2.134352	0.026623	0.973377
	F4b	0.9903	1.7291	1.7274	0.7371	0.0017	2.306336	0.021327	0.978673

Location	Average VS/ dry sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
1	2.24	0.39	0.986979	0.0148685
2	1.16	#DIV/0!	0.947722	0.046777
3	1.75	0.02	0.946541	0.0017728

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Table F7d. Cd flowcell volatile solids (VS) raw data (day 149).

Sample Name	Pan Weight (g)	Pan + Sand wt (g)	Wt after 100 C (g)	Wt after 550 C (g)	Dry Sand Wt (g)	Volatile Solids Wt (g)	Biomass wt/dry sand wt (mg/g)	Fraction water in sand sample	Fraction dry sand
Cd day 149	F1a	0.9775	2.1883	2.1552	2.1515	1.174	0.0037	0.027337	0.972663
	F1b	0.979	1.9745	1.9695	1.9688	0.9898	0.0007	0.005023	0.994977
	F2a	0.9779	2.5563	2.4262	2.4213	1.4434	0.0049	3.394762	0.917575
	F2b	0.9792	2.4175	2.3095	2.307	1.3278	0.0025	1.882814	0.075089
	F3a	0.9837	2.2472	2.2157	2.2134	1.2297	0.0023	1.870375	0.024931
	F3b	0.9873	2.3493	2.3351	2.3297	1.3424	0.0054	4.022646	0.010426
	F4a	0.9811	2.3165	2.2498	2.2467	1.2656	0.0031	2.449431	0.049948
	F4b	0.9906	2.3406	2.2746	2.272	1.2814	0.0026	2.029031	0.048889

Location	Average VS/ wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
Cd day 149	1	1.93	0.98382	0.0157789
	2	2.64	0.921243	0.0051878
	3	2.95	0.982322	0.0102565
	4	2.24	0.950582	0.0007486

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Table F7e. Cd flowcell volatile solids (VS) raw data (day 170).

Sample Name	Pan Weight (g)	Pan + Sand wt (g)	Wt after 100 C (g)	Wt after 550 C (g)	Dry Sand Wt (g)	Volatile Solids Wt (g)	Biomass wt/dry sand wt (mg/g)	Fraction water in sand sample	Fraction dry sand
Cd day 170	F1a	0.9775	1.9915	1.9911	1.9891	1.0116	1.977066	0.000394	0.999606
	F1b	0.979	1.831	1.831	1.8285	0.8495	2.942908	0	1
	F2a	0.9781	2.3213	2.2569	2.253	1.2749	3.059063	0.047945	0.952055
	F2b	0.9793	1.9718	1.9678	1.9659	0.9866	1.925806	0.00403	0.99597
	F3a	0.983	2.2752	2.2431	2.2371	1.2541	4.784307	0.024841	0.975159
	F3b	0.9871	1.9287	1.9284	1.926	0.9389	2.556183	0.000319	0.999681
	F4a	0.9815	1.8889	1.8634	1.8607	0.8792	3.070974	0.028102	0.971898
	F4b	0.9907	1.9157	1.8943	1.8917	0.901	2.885683	0.023135	0.976865

Location	Average VS/wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
Cd day 170	1	0.68	0.999803	0.0002789
	2	0.80	0.974012	0.0310526
	3	1.58	0.98742	0.0173402
	4	0.13	0.974381	0.0035123

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Table F7f. Cd flowcell volatile solids (VS) raw data (day 191).

Sample Name	Pan Weight (g)	Pan + Sand wt (g)	Wt after 100 C (g)	Wt after 550 C (g)	Dry Sand Wt (g)	Volatile Solids Wt (g)	Biomass wt/dry sand wt (mg/g)	Fraction water in sand sample	Fraction dry sand
Cd day 191	F1a	0.9797	2.234	2.2301	1.2504	0.0039	3.119002	0.036118	0.963882
	F1b	0.9802	2.207	2.2033	1.2231	0.0037	3.0251	0.023404	0.976596
	F2a	0.9839	2.2896	2.1956	2.194	1.2101	0.0016	1.322205	0.071992
	F2b	0.9875	2.004	1.9528	1.9505	0.963	0.0023	2.38837	0.050369
	F3a	0.9817	2.3064	2.2493	2.2442	1.2625	0.0051	4.039604	0.043104
	F3b	0.9918	2.0866	2.0286	2.025	1.0332	0.0036	3.484321	0.052978
	F4a	0.9783	1.7917	1.7673	1.7653	0.787	0.002	2.541296	0.029998
	F4b	0.9799	1.717	1.7135	1.7108	0.7309	0.0027	3.694076	0.004748

Location	Average VS/wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
Cd day 191	1	0.07	0.970239	0.00899
	2	0.75	0.93882	0.0152899
	3	0.39	0.951959	0.0069817
	4	0.82	0.982627	0.0178539



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Table F7g. Cd flowcell volatile solids (VS) raw data (day 275).

Sample Name	Pan Weight (g)	Pan + Sand wt (g)	Wt after 100 C (g)	Wt after 550 C (g)	Dry Sand Wt (g)	Volatile Solids Wt (g)	Biomass wt/dry sand wt (mg/g)	Fraction water in sand sample	Fraction dry sand
<b>Cd day 275</b>	F1a	0.9778	2.4824	2.3562	2.3498	1.372	4.664723	0.083876	0.916124
	F1b	0.9792	2.4696	2.3621	2.3571	1.3779	3.62871	0.072128	0.927872
	F2a	0.9797	2.2107	2.1158	2.1102	1.1305	4.95356	0.077092	0.922908
	F2b	0.9795	2.2808	2.1684	2.1661	1.1866	1.938311	0.086375	0.913625
	F3a	0.9832	2.4622	2.3436	2.3387	1.3555	3.614902	0.080189	0.919811
	F3b	0.9871	2.7982	2.6404	2.6362	1.6491	2.546844	0.087129	0.912871
	F4a	0.9815	1.8477	1.8184	1.8169	0.8354	1.795547	0.033826	0.966174
	F4b	0.9911	2.3596	2.254	2.2513	1.2602	2.142517	0.077165	0.922835

Location	Average VS/wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
<b>Cd day 275</b>	1	0.73	0.921998	0.008307
	2	2.13	0.918267	0.0065643
	3	0.76	0.916341	0.0049074
	4	0.25	0.944505	0.0306452

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Table F7h. Cd column volatile solids (VS) raw data (day 276).

Sample Name	Pan Weight (g)	Pan + Sand wt (g)	Wt after 100 C (g)	Wt after 550 C (g)	Dry Sand Wt (g)	Volatile Solids Wt (g)	Biomass wt/dry sand wt (mg/g)	Fraction water in sand sample	Fraction dry sand	
Cd day 276	Inf a	0.9802	10.5161	8.6849	8.6676	7.6874	0.0173	2.2504	0.192032	0.807968
	Inf b	0.9837	9.9164	8.1921	8.1755	7.1918	0.0166	2.3082	0.193032	0.806968
	F1a	0.9878	9.7612	8.0596	8.0465	7.0587	0.0131	1.8559	0.19395	0.80605
	F1b	0.9825	10.7935	8.871	8.8608	7.8783	0.0102	1.2947	0.195954	0.804046
	F2a	0.9867	15.441	12.5739	12.5627	11.576	0.0112	0.9675	0.198356	0.801644
	F2b	0.9756	14.1468	11.5407	11.5267	10.5511	0.014	1.3269	0.197864	0.802136
	F3a	0.9778	13.4033	10.9457	10.932	9.9542	0.0137	1.3763	0.197787	0.802213
	F3b	0.9771	14.8375	12.0465	12.0312	11.0541	0.0153	1.3841	0.201365	0.798635
	F4a	0.9888	15.7514	12.8194	12.8008	11.812	0.0186	1.5747	0.19861	0.80139
	F4b	0.9813	12.9191	10.6068	10.5898	9.6085	0.017	1.7693	0.193696	0.806304
	Eff a	0.9777	17.7545	14.3917	14.3763	13.3986	0.0154	1.1494	0.200443	0.799557
	Eff b	0.9804	13.3136	10.8926	10.8743	9.8939	0.0183	1.8496	0.196299	0.803701

Location	Average VS/ wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
Inf	2.2793	0.040834	0.807468	0.0007072
1	1.58	0.40	0.805048	0.0014168
2	1.15	0.25	0.80189	0.0003484
3	1.38	0.01	0.800424	0.0025302
4	1.67	0.14	0.803847	0.003475
Eff	1.4995	0.495152	0.801629	0.0029303

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Table F8. column carbohydrates concentrations for Figure 5.39.

Location	Time (days)	Ave. (ug/g dry sand)	s	Time (days)	Ave. (ug/g dry sand)	s	Time (days)	Ave. (ug/g dry sand)	s	Time (days)	Ave. (ug/g dry sand)	s
Inf												
F1	53	36.37271	6.890532	113	60.67045	5.025584	135	79.37662	7.431843	149	89.2986	7.87831
F2		24.68541	5.633472		46.651328	2.489751		49.20572	9.103445		61.97545	9.05175
F3		32.72645	0.183414		61.416885	5.832113		78.45695	13.57254		85.75347	14.7317
F4		40.20926	6.648775		81.905681	8.256095		128.0925	52.40762		142.4251	55.1547
Eff												

Location	Time (days)	Ave. (ug/g dry sand)	s	Time (days)	Ave. (ug/g dry sand)	s	Time (days)	Ave. (ug/g dry sand)	s	Time (days)	Ave. (ug/g dry sand)	s
Inf												
F1	170	84.86656	11.99458	191	73.168008	3.919145	275	84.14585	11.49152	276	123.9671	2.25978
F2		83.32207	0.713962		132.8147	14.8713		126.6414	5.022013		28.35991	3.41332
F3		100.0648	1.749062		119.79031	22.93247		145.2317	13.72233		17.08108	3.27121
F4		68.36646	8.796446		103.95806	3.633986		138.3732	23.78225		23.75562	0.73924
Eff												

Calculations

s = standard deviation of triplicate analysis

where

$x_i$  = single value

$\bar{x}$  = average of values

n = number of observations

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

## Appendix F

Table F.8 Calculations used on control column carbohydrates raw data.

### Calculation Steps:

1. Convert transmittance to absorbance:

$$Abs = \log\left(\frac{100}{trans}\right)$$

where

Abs = absorbance

trans = transmittance

2. Adjust absorbance reading down using black absorbance.

3. Determine protein mass:

Use standard curve trendline equation, solving for x

4. Determine dry sand mass:

Multiply wet sand mass by fraction dry sand average from VS data.

5. Calculate carbohydrate concentration:

$$[Carbs] = \frac{\text{carbs mass } (\mu\text{g})}{\text{dry sand mass (g)}}$$

6. Average the carbohydrate concentrations

$$\bar{x} = \frac{(x_1 + x_2)}{2}$$

where

$\bar{x}$  = average value

$x_1, x_2$  = carbohydrate concentration

7. Determine the duplicate sample standard deviation

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

where

$x_i$  = carbohydrate concentration

$n$  = number of observations

3. Trendline equations used for:

days 53 and 113<sup>a</sup>

$$x = \frac{107.53y}{2}$$

day 135

$$x = 106.38y$$

day 149

$$x = 107.53y$$

day 170

$$x = 103.09y$$

day 191

$$x = 109.89y$$

day 275

$$x = 102.04y$$

day 276

$$x = 102.04y$$

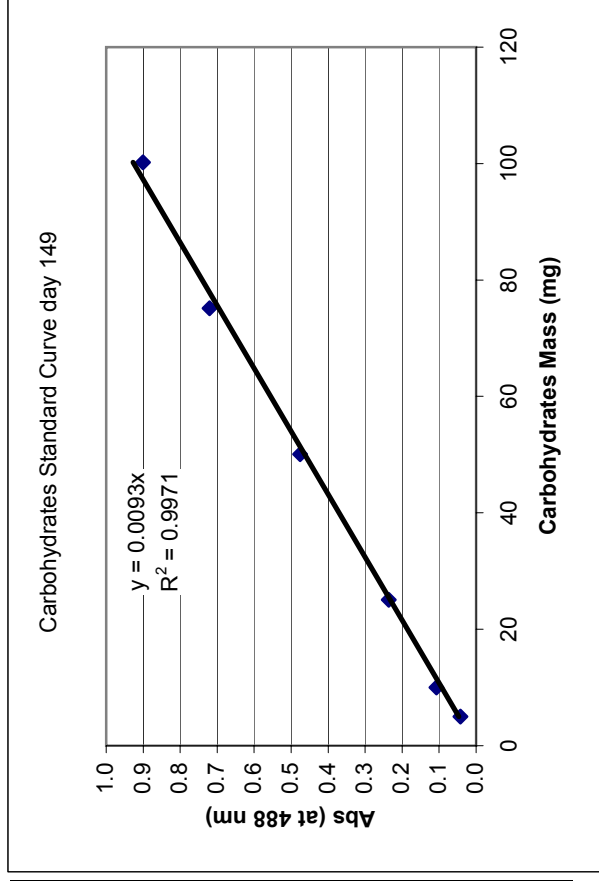
Analysis Note:

<sup>a</sup>Days 53 and 113 show a trendline equation divided by 2. This trendline was used from day 149 carbohydrates standard curve. It was determined post-analysis on these days that the carbohydrates standards were improperly made, therefore a different standard curve was applied. The sample to reagent ratio was 1:1 on days 53 and 114, whereas the standard to reagent ratio was 1:1 on day 149 (and all other days). The 1:2 sample to reagent ratio effectively doubled the concentration compared to all other carbohydrate analysis groups.

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Table F8a. Cd column carbohydrates raw data day 53.

Standard	% Trans.	Abs.	Adjust	Ave.	Std Dev.
0 ug	98	0.009	0.012		
	96.5	0.015			
5 ug	88	0.056	0.044	0.042	0.002
	88.5	0.053	0.041		
10 ug	75.5	0.122	0.110	0.107	0.004
	76.5	0.116	0.104		
25 ug	55.5	0.256	0.244	0.236	0.011
	57.5	0.240	0.228		
50 ug	33	0.481	0.469	0.476	0.009
	32	0.495	0.483		
75 ug	18.5	0.733	0.721	0.721	
100 ug	13	0.886	0.874	0.901	0.038
	11.5	0.939	0.927		



Sample Name	%Trans	Abs.	Adjust	Mass			Conc.	Location	average fraction of dry sand	s dry sand fraction	Ave. (µg/g sand)	s
				carbs mass, µg	wet sand, g	dry sand, g						
CdFL1a	52.5	0.280	0.268	14.400	0.534	0.457139	31.50	CdFL1a	0.856066	0.008945	36.37	6.89053
CdFL1b	50	0.301	0.289	15.539	0.4401	0.376755	41.25	CdFL2a	0.855209	0.016281	24.69	5.63347
CdFL2a	72	0.143	0.131	7.025	0.3968	0.339347	20.70	CdFL3a	0.86039	0.010593	32.73	0.18341
CdFL2b	64	0.194	0.182	9.775	0.3987	0.340972	28.67	CdFL4a	0.878439	0.007699	40.21	6.64878
CdFL3a	58	0.237	0.225	12.074	0.4305	0.370398	32.60					
CdFL3b	60	0.222	0.210	11.282	0.3991	0.343382	32.86					
CdFL4a	40.5	0.393	0.381	20.459	0.5186	0.455559	44.91					
CdFL4b	56.5	0.248	0.236	12.686	0.4067	0.357261	35.51					

**Appendix F**

Used same standard curve as day 53 and 149.

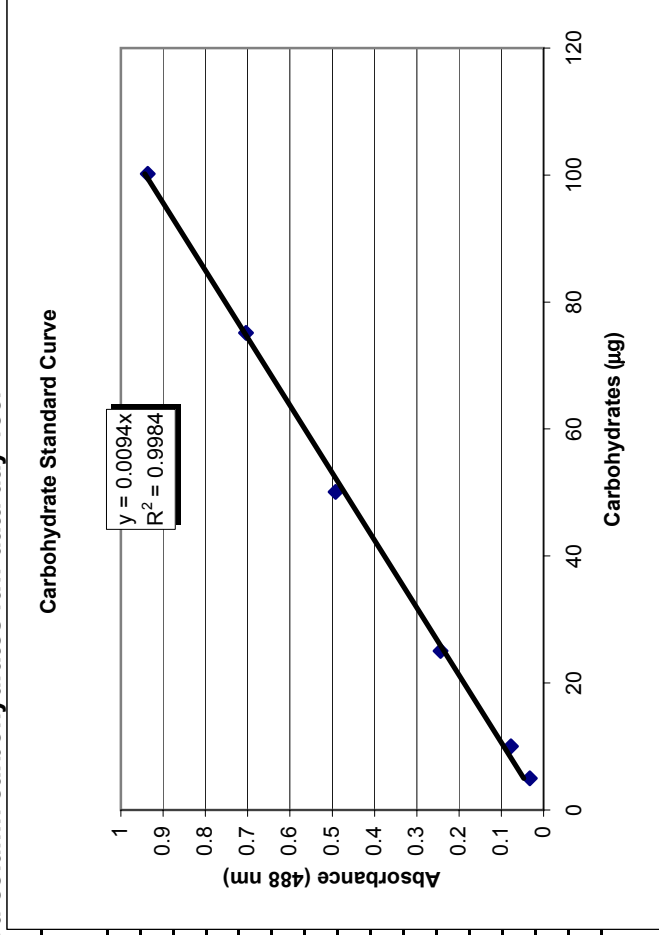
**Table F.8b. Cd column carbohydrates raw data day 113.**

Sample Name	%Trans	Abs.	Adjust	Mass carbs mass, µg	Mass wet sand, g	Mass dry sand, g	Conc. µg/g dry sand	Location	average fraction of dry sand	s dry sand fraction	Ave. (µg/g sand)	s
CdFL1a	24	0.620	0.608	32.677	0.5955	0.571989	57.13	CdFL1a	0.96052	#DIV/0!	60.68	5.0266
CdFL1b	24	0.620	0.608	32.677	0.5296	0.508691	64.24	CdFL2a	0.978483	0.001833	46.66	2.49149
CdFL2a	33.5	0.475	0.463	24.890	0.5665	0.554311	44.90	CdFL3a	0.956943	0.00699	61.43	5.8328
CdFL2b	37.5	0.426	0.414	22.256	0.4697	0.459594	48.43	CdFL4a	0.971496	0.007077	81.92	8.25639
CdFL3a	26	0.585	0.573	30.808	0.5618	0.53761	57.31					
CdFL3b	24	0.620	0.608	32.677	0.5209	0.498471	65.55					
CdFL4a	13	0.886	0.874	46.992	0.5512	0.535489	87.76					
CdFL4b	16	0.796	0.784	42.144	0.5702	0.553947	76.08					

Appendix F

Table F.8c. Cd column carbohydrates raw data day 135.

Standard	% Trans.	Abs.	Adjust	Ave.	Std Dev.
0 ug	85.5	0.068	0.053		
	91.5	0.039			
5 ug	82	0.086	0.033	0.033	
10 ug	73.5	0.134	0.081	0.078	0.004
	74.5	0.128	0.075		
25 ug	50	0.301	0.248	0.244	0.006
	51	0.292	0.239		
50 ug	28.5	0.545	0.492	0.492	
75 ug	18	0.745	0.692	0.704	0.018
	17	0.770	0.717		
100 ug	10	1.000	0.947	0.936	0.015
	10.5	0.979	0.926		

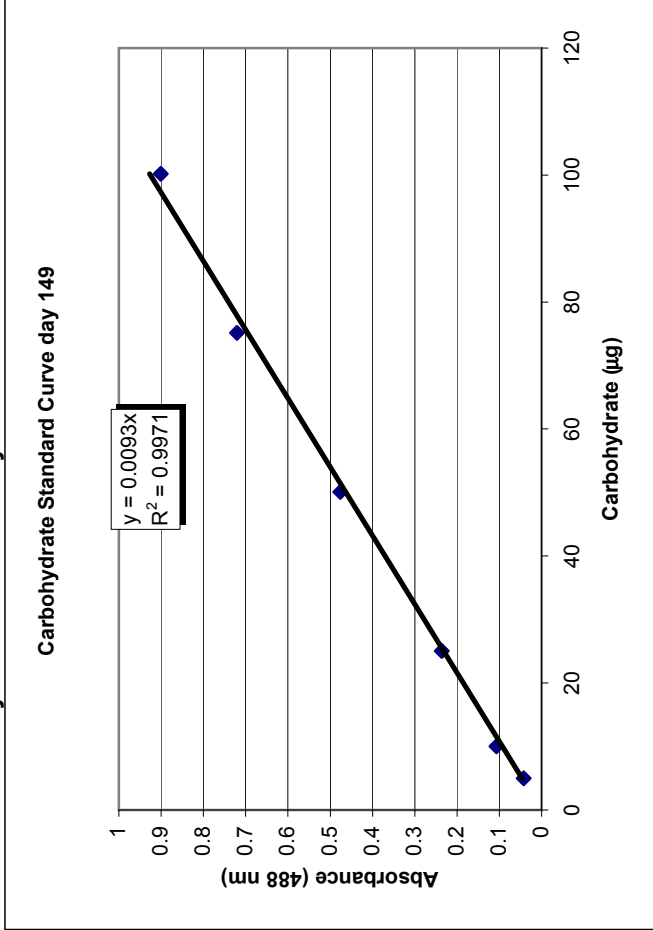


Sample Name	%Trans	Abs.	Adjust	Mass		Conc.	Location	average fraction of dry sand	s dry sand fraction	Ave. (µg/g sand)	s
				carbs mass, µg	wet sand, g						
CdFL1a	36	0.444	0.391	41.564	0.4972	84.70	CdFL1a	0.986979	0.014869	79.44	7.43436
CdFL1b	38.5	0.415	0.362	38.462	0.5253	74.18	CdFL2a	0.947722	0.046777	49.28	9.10048
CdFL2a	60.5	0.218	0.165	17.579	0.4329	42.85	CdFL3a	0.946541	0.001773	78.53	13.5841
CdFL2b	52.5	0.280	0.227	24.132	0.457	55.72	CdFL4a	0.976025	0.003745	128.16	52.4131
CdFL3a	41	0.387	0.334	35.555	0.545	68.92					
CdFL3b	40.5	0.393	0.340	36.122	0.433	88.13					
CdFL4a	32.5	0.488	0.435	46.289	0.5206	91.10					
CdFL4b	17.5	0.757	0.704	74.890	0.4644	165.22					

Appendix F

Table F.8d. Cd column carbohydrates raw data day 149.

Standard	% Trans.	Abs.	Adjust	Ave.	Std Dev.
0 ug	98	0.009	0.012		
	96.5	0.015			
5 ug	88	0.056	0.044	0.042	0.002
	88.5	0.053	0.041		
10 ug	75.5	0.122	0.110	0.107	0.004
	76.5	0.116	0.104		
25 ug	55.5	0.256	0.244	0.236	0.011
	57.5	0.240	0.228		
50 ug	33	0.481	0.469	0.476	0.009
	32	0.495	0.483		
75 ug	18.5	0.733	0.721	0.721	
100 ug	13	0.886	0.874	0.901	0.038
	11.5	0.939	0.927		



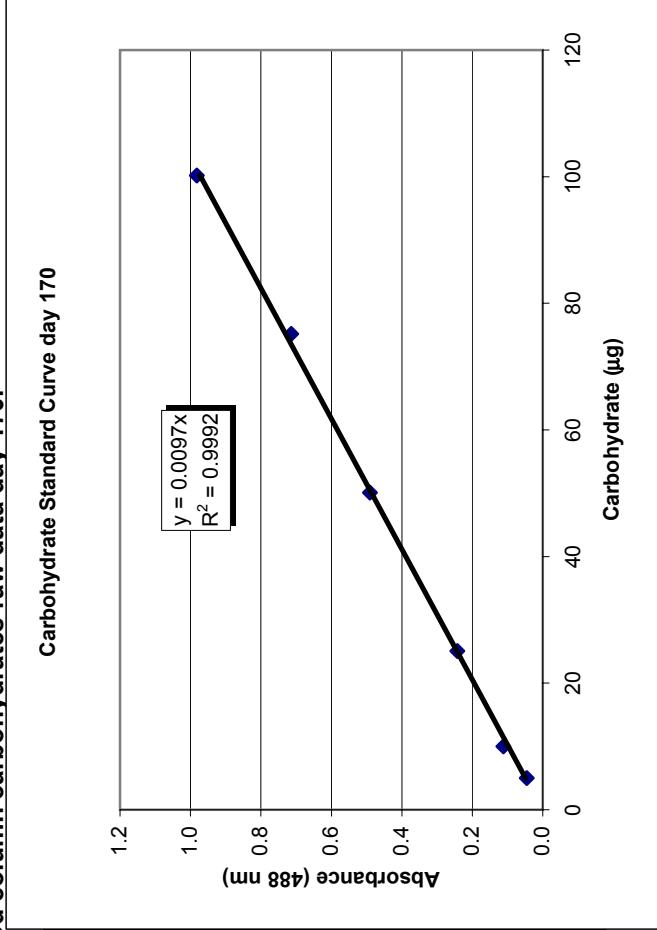
Sample Name	%Trans	Abs.	Adjust	Mass		Conc. µg/g dry sand	Location	average fraction of dry sand		Ave. (µg/g sand)	s
				carbs mass, µg	wet sand, g			s dry sand fraction	s		
CdFL1a	36	0.444	0.432	46.419	0.4972	94.90	CdFL1a	0.98382	0.015779	89.32	7.87934
CdFL1b	38.5	0.415	0.403	43.284	0.5253	83.75	CdFL2a	0.921243	0.005188	62.01	9.05051
CdFL2a	60.5	0.218	0.206	22.177	0.4329	55.61	CdFL3a	0.982322	0.010257	85.78	14.7362
CdFL2b	52.5	0.280	0.268	28.800	0.457	68.41	CdFL4a	0.950582	0.000749	142.45	55.157
CdFL3a	41	0.387	0.375	40.346	0.545	75.36					
CdFL3b	40.5	0.393	0.381	40.919	0.433	96.20					
CdFL4a	32.5	0.488	0.476	51.195	0.5206	103.45					
CdFL4b	17.5	0.757	0.745	80.104	0.4644	181.46					



Appendix F

Table F.8e. Cd column carbohydrates raw data day 170.

Standard	% Trans.	Abs.	Adjust	Ave.	Std Dev.
0 ug	98	0.009	0.008		
	98.5	0.007			
5 ug	90	0.046	0.038	0.045	0.010
	87	0.060	0.052		
10 ug	76	0.119	0.111	0.111	0.000
	76	0.119	0.111		
25 ug	55.5	0.256	0.248	0.242	0.008
	57	0.244	0.236		
50 ug	31.5	0.502	0.494	0.490	0.005
	32	0.495	0.487		
75 ug	19	0.721	0.713	0.713	
	19	0.721	0.713		
100 ug	10.5	0.979	0.971	0.981	0.015
	10	1.000	0.992		

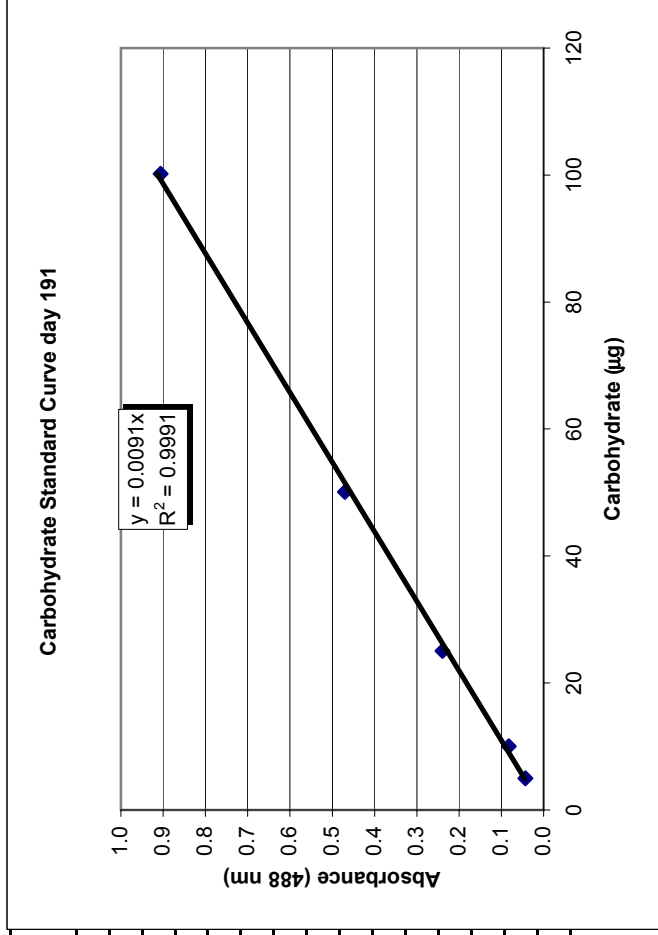


Sample Name	%Trans	Abs.	Adjust	Mass		Conc. µg/g dry sand	Location	average fraction of dry sand	s dry sand fraction	Ave. (µg/g sand)	s
				carbs mass, µg	wet sand, g						
CdFL1a	31.5	0.502	0.494	50.896	0.5457	93.29	CdFL1a	0.999803	0.000279	84.81	11.9914
CdFL1b	36	0.444	0.436	44.917	0.5886	76.33	CdFL2a	0.974012	0.031053	83.25	0.71892
CdFL2a	42	0.377	0.369	38.016	0.4717	82.74	CdFL3a	0.98742	0.01734	99.99	1.76315
CdFL2b	38	0.420	0.412	42.497	0.5209	83.76	CdFL4a	0.974381	0.003512	68.30	8.79522
CdFL3a	30	0.523	0.515	53.080	0.531	101.24					
CdFL3b	40.5	0.393	0.385	39.644	0.4066	98.74					
CdFL4a	41	0.387	0.379	39.094	0.5384	74.52					
CdFL4b	46.5	0.333	0.325	33.458	0.5531	62.08					

Appendix F

Table F.8e. Cd column carbohydrates raw data day 191.

Standard	% Trans.	Abs.	Adjust	Ave.	Std Dev.
0 ug	98	0.009	0.015		
	95	0.022			
	97	0.013			
5 ug	87.5	0.058	0.043	0.043	0.000
	87.5	0.058	0.043		
10 ug	80	0.097	0.082	0.082	0.000
	80	0.097	0.082		
25 ug	55.5	0.256	0.241	0.239	0.003
	56	0.252	0.237		
50 ug	33.5	0.475	0.460	0.470	0.014
	32	0.495	0.480		
75 ug	12	0.921	0.906	0.915	0.013
	11.5	0.939	0.924		
100 ug	12	0.921	0.906	0.906	0.000
	12	0.921	0.906		

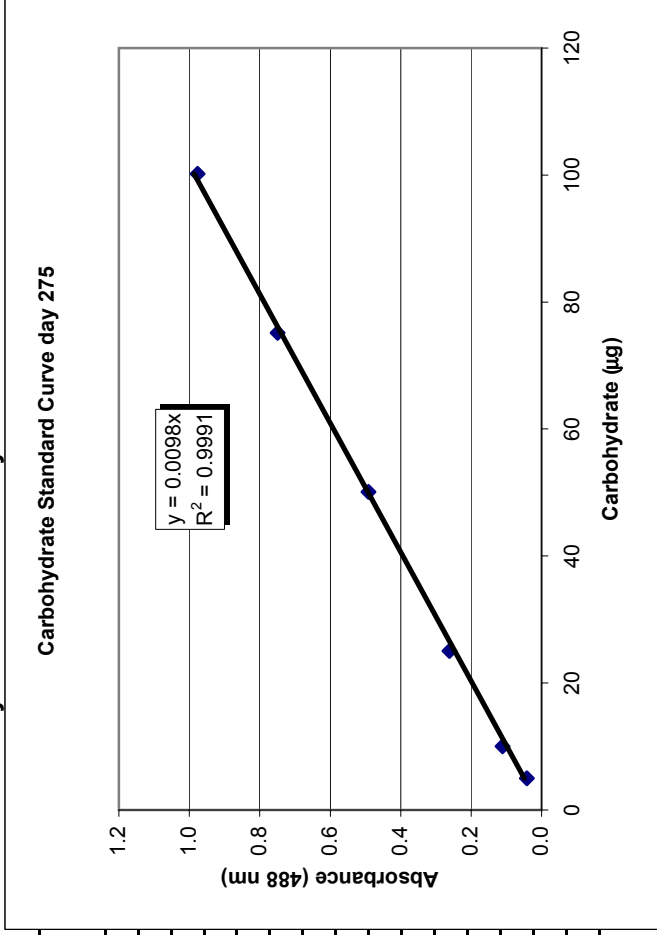


Sample Name	%Trans	Abs.	Adjust	Mass		Conc.	Location	average fraction of dry sand	s dry sand fraction	Ave. (µg/g sand)	s
				carbs mass, µg	wet sand, g						
CdFL1a	39	0.409	0.394	43.290	0.5879	75.89	CdFL1a	0.970239	0.00899	73.12	3.92141
CdFL1b	44	0.357	0.342	37.533	0.5499	70.35	CdFL2a	0.93882	0.01529	132.76	14.8664
CdFL2a	25	0.602	0.587	64.512	0.5621	122.25	CdFL3a	0.951959	0.006982	119.73	22.9323
CdFL2b	24	0.620	0.605	66.460	0.4941	143.27	CdFL4a	0.982627	0.017854	103.90	3.63759
CdFL3a	37.5	0.426	0.411	45.161	0.4583	103.51					
CdFL3b	28	0.553	0.538	59.104	0.4567	135.95					
CdFL4a	37	0.432	0.417	45.802	0.46	101.33					
CdFL4b	32	0.495	0.480	52.731	0.504	106.47					

Appendix F

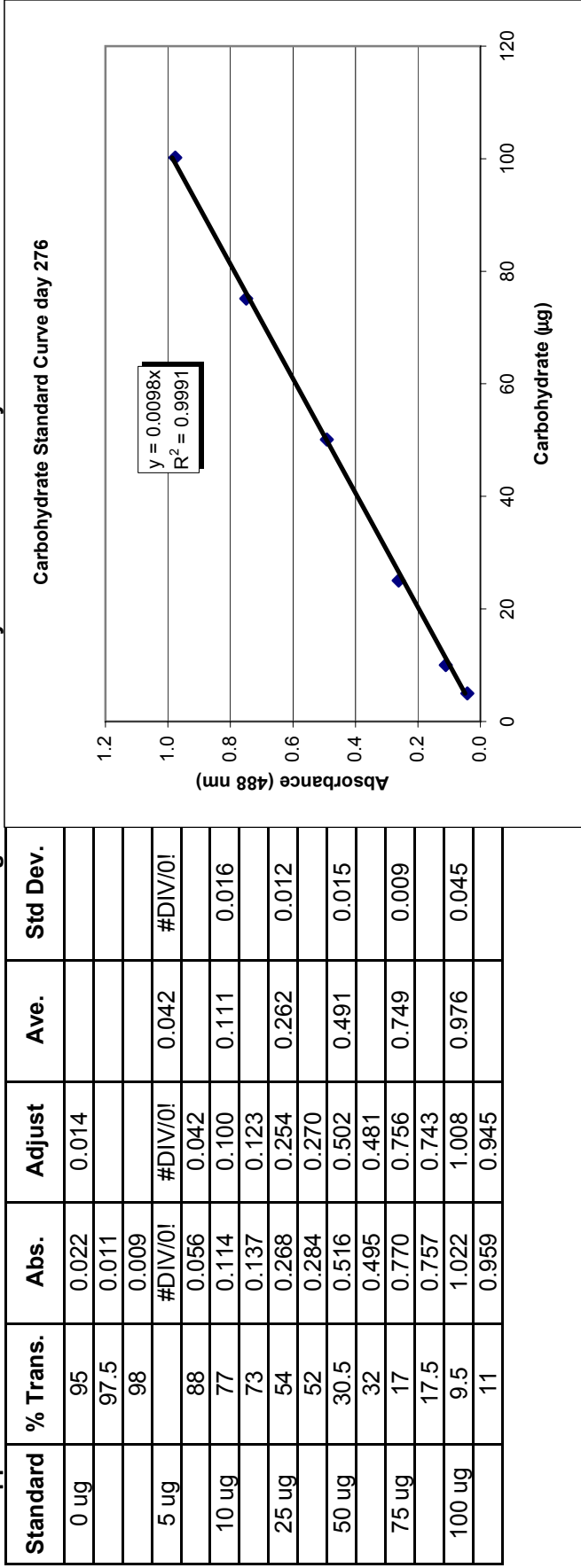
Table F.8f. Cd column carbohydrates raw data day 275.

Standard	% Trans.	Abs.	Adjust	Ave.	Std Dev.
0 ug	95	0.022	0.014		
	97.5	0.011			
	98	0.009			
5 ug		#DIV/0!	#DIV/0!	0.042	#DIV/0!
	88	0.056	0.042		
10 ug	77	0.114	0.100	0.111	0.016
	73	0.137	0.123		
25 ug	54	0.268	0.254	0.262	
	52	0.284	0.270		
50 ug	30.5	0.516	0.502	0.491	0.015
	32	0.495	0.481		
75 ug	17	0.770	0.756	0.749	0.009
	17.5	0.757	0.743		
100 ug	9.5	1.022	1.008	0.976	0.045
	11	0.959	0.945		



Sample Name	%Trans	Abs.	Adjust	Mass			Conc.	Location	average fraction of dry sand	s dry sand fraction	Ave. (µg/g sand)	s
				carbs mass, µg	wet sand, g	dry sand, g						
CdFL1a	43.5	0.362	0.348	35.460	0.5059	0.466439	76.02	CdFL1a	0.921998	0.008307	84.15	11.4913
CdFL1b	33	0.481	0.467	47.703	0.5607	0.516964	92.27	CdFL2a	0.918267	0.006564	126.64	5.0218
CdFL2a	27	0.569	0.555	56.596	0.5007	0.459776	123.09	CdFL3a	0.916341	0.004907	145.24	13.7222
CdFL2b	22	0.658	0.644	65.671	0.5493	0.504404	130.20	CdFL4a	0.944505	0.030645	138.38	23.7821
CdFL3a	25.5	0.593	0.579	59.129	0.4761	0.43627	135.53					
CdFL3b	20	0.699	0.685	69.895	0.4923	0.451115	154.94					
CdFL4a	26	0.585	0.571	58.268	0.5075	0.479336	121.56					
CdFL4b	16	0.796	0.782	79.784	0.5443	0.514094	155.19					

Appendix F Table F.8g. Cd column carbohydrates raw data day 276.



Standard	% Trans.	Abs.	Adjust	Ave.	Std Dev.
0 ug	95	0.022	0.014		
	97.5	0.011			
	98	0.009			
5 ug		#DIV/0!	#DIV/0!	0.042	#DIV/0!
	88	0.056	0.042		
10 ug	77	0.114	0.100	0.111	0.016
	73	0.137	0.123		
25 ug	54	0.268	0.254	0.262	0.012
	52	0.284	0.270		
50 ug	30.5	0.516	0.502	0.491	0.015
	32	0.495	0.481		
75 ug	17	0.770	0.756	0.749	0.009
	17.5	0.757	0.743		
100 ug	9.5	1.022	1.008	0.976	0.045
	11	0.959	0.945		

Sample Name	%Trans	Abs.	Adjust	Mass carbs mass, µg	Mass wet sand, g	Mass dry sand, g	Conc. µg/g dry sand	Location	average fraction of dry sand	s dry sand fraction	Ave. (µg/g sand)	s
Cd Inf a	31	0.509	0.495	50.473	0.5108	0.412455	122.37	Cd Inf	0.807468	0.000707	123.97	2.26005
Cd Inf b	33.5	0.475	0.461	47.036	0.4639	0.374584	125.57	CdFL1a	0.805048	0.001417	32.75	
CdFL1a	72	0.143	0.129	13.129	0.498	0.400914	32.75	CdFL2a	0.80189	0.000348	28.36	3.41344
CdFL1b		#DIV/0!	#DIV/0!	#DIV/0!	0.5639	0.453967	#DIV/0!	CdFL3a	0.800424	0.00253	17.09	3.27129
CdFL2a	71.5	0.146	0.132	13.438	0.5445	0.436629	30.78	CdFL4a	0.803847	0.003475	23.76	0.73979
CdFL2b	74	0.131	0.117	11.915	0.5726	0.459162	25.95	Cd Eff	0.801629	0.00293	21.47	
CdFL3a	85	0.071	0.057	5.774	0.4883	0.390847	14.77					
CdFL3b	82	0.086	0.072	7.366	0.4744	0.379721	19.40					
CdFL4a	78.5	0.105	0.091	9.299	0.4764	0.382953	24.28					
CdFL4b	75.5	0.122	0.108	11.026	0.5903	0.474511	23.24					
Cd Eff a	80	0.097	0.083	8.460	0.4916	0.394081	21.47					
Cd Eff b		#DIV/0!	#DIV/0!	#DIV/0!	0.4637	0.371715	#DIV/0!					

Appendix F

Table F.9. Cd column protein concentrations.

Location	Time (days)	Average of Duplicate (µg/g dry sand)	s (of duplicate)	Time (days)	Average of Duplicate (µg/g dry sand)	s (of duplicate)	Time (days)	Average of Duplicate (µg/g dry sand)	s (of duplicate)	Time (days)	Average of Duplicate (µg/g dry sand)	s (of duplicate)
Inf												
F1	53	506.2259	40.7433	113	219.9559	7.892036	135	375.4566	20.97017	149	281.8634	56.5417
F2		201.0469	6.909767		163.79965	17.96779		193.3141	17.08134		229.5248	24.0982
F3		330.5305	60.14677		226.44831	33.92531		228.9445	2.461142		256.6763	82.565
F4		387.4653	17.06545		366.77975	25.52526		377.0346	32.68537		396.7112	84.5989
Eff												

Location	Time (days)	Average of Duplicate (µg/g dry sand)	s (of duplicate)	Time (days)	Average of Duplicate (µg/g dry sand)	s (of duplicate)	Time (days)	Average of Duplicate (µg/g dry sand)	s (of duplicate)	Time (days)	Average of Duplicate (µg/g dry sand)	s (of duplicate)
Inf												
F1	170	468.3633	10.71897	191	252.69218	10.96271	275	366.0096	98.01684	276	433.2868	14.8843
F2		363.0444	13.55222		426.64723	5.907557		639.8551	233.3953		89.36713	4.03049
F3		312.3755	61.78517		285.90654	55.93463		412.2211	29.6176		112.0454	2.98294
F4		499.1655	339.4488		386.50744	35.24868		481.9156	27.05127		92.53143	30.8842
Eff											22.82281	5.06006

Calculations:

Average of duplicate:

$$\bar{x} = \frac{(x_1 + x_2)}{2}$$

where

$\bar{x}$  = average value

$x_1, x_2$  = carbohydrates concentration

s = standard deviation of triplicate analysis

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

where

$x_i$  = single value

$\bar{x}$  = average of values

n = number of observations

## Appendix F

Table F.8a-g. Control column protein concentrations calculations.

### Calculation Steps:

1. Use trendline equation from calibration curve to determine protein mass.

2. Account for 50  $\mu\text{L}$  of sample transferred to one of reagent mixture:

$$= \text{protein mass} * \frac{50}{1000}$$

3. Using the fraction of dry sand obtained from VS calculations determine the dry sand mass.

Dry sand mass = wet sand mass \* dry fraction

4. Determine the protein concentration by dividing the protein mass by dry sand mass ( $\mu\text{g}$  protein/g dry sand)

5. Average the two protein concentration samples.

$$\bar{x} = \frac{(x_1 + x_2)}{2}$$

$\bar{x}$  here

= average value

$x_1, x_2$  = carbohydrates concentration

6. Determine standard deviation of 2 samples  
s = standard deviation of triplicate analysis

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$

where

$\bar{x}$  = single value

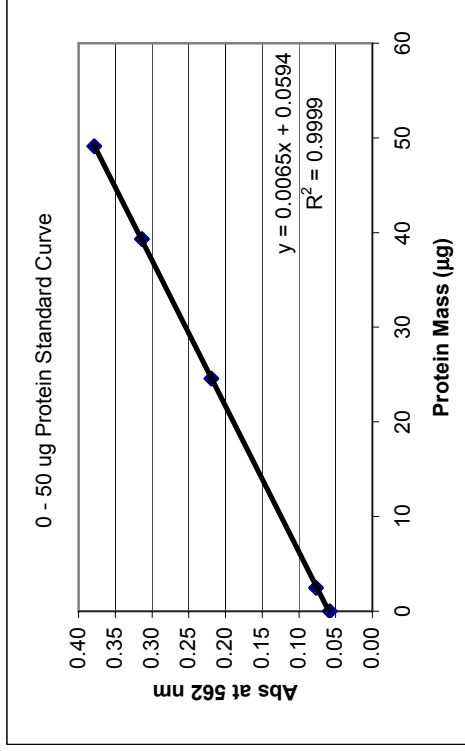
= average of values

n = number of observations

Appendix F

Table F.9a. Cd flowcell protein concentrations raw data for day 53.

Standard Conc. (g/ml)	Protein Mass in Standard (µg)	Abs at 562nm
0	0	0.058045
0.05	2.456342	0.076697
0.5	24.56342	0.219199
0.8	39.30148	0.313863
1	49.12685	0.378665



**Trendline Equations Used:**  
day 53:

$$P = \frac{Abs - 0.0594}{0.0065}$$

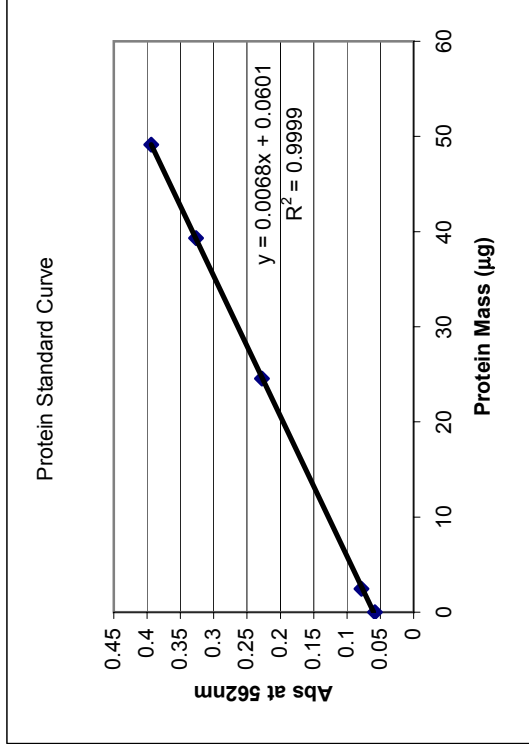
where  
P = protein mass (µg)  
Abs = absorbance reading

Location (day 53)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
F1a	0.11691	8.848348	176.967	0.433	0.3706766	477.4161	0.856066	0.008945	506.2259	40.7433
F1b	0.13322	11.35675	227.1351	0.4959	0.4245232	535.0358	0.855209	0.016281	201.0469	6.90977
F2a	0.08685	4.222485	84.44969	0.5034	0.4305123	196.1609	0.86039	0.010593	330.5305	60.1468
F2b	0.08869	4.505919	90.11837	0.5117	0.4376105	205.9328	0.878439	0.007699	387.4653	17.0654
F3a	0.10757	7.411378	148.2276	0.4618	0.3973283	373.0607				
F3b	0.09855	6.02384	120.4768	0.4862	0.4183218	288.0003				
F4a	0.11325	8.284526	165.6905	0.4721	0.4147111	399.5324				
F4b	0.11357	8.333148	166.663	0.5054	0.4439631	375.3982				

Appendix F

Table F.9b. Cd flowcell protein concentrations raw data for day 113.

Standard Conc. (g/ml)	Protein Mass in Standard (µg)	Abs at 562nm
0	0	0.05832
0.05	2.456342	0.078318
0.1	4.912685	
0.5	24.56342	0.227666
0.8	39.30148	0.326716
1	49.12685	0.393911



Trendline Equations Used:

day 113:

$$P = \frac{Abs - 0.0601}{0.0068}$$

where

P = protein mass (µg)

Abs = absorbance reading

Location (day 113)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.10159	6.102195	122.0439	0.5927	0.5693	214.3754	0.96052	#DIV/0!
F1b	0.10401	6.456721	129.1344	0.5961	0.5725658	225.5364	0.978483	0.001833
F2a	0.08891	4.236454	84.72909	0.5731	0.5607689	151.0945	0.956943	0.00699
F2b	0.09329	4.8807	97.61401	0.5652	0.5530388	176.5048	0.971496	0.007077
F3a	0.09528	5.173884	103.4777	0.5341	0.5111031	202.4595		
F3b	0.10205	6.168693	123.3739	0.5148	0.4926341	250.4371		
F4a	0.11959	8.749265	174.9853	0.5165	0.5017778	348.7307		
F4b	0.13112	10.44377	208.8754	0.5587	0.5427749	384.8288		

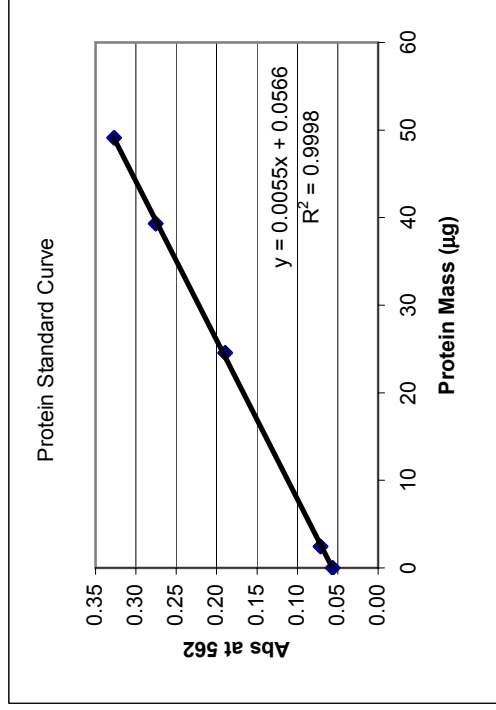
Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	219.9559	7.89204
2	163.7996	17.9678
3	226.4483	33.9253
4	366.7798	25.5253



Appendix F

Table F.9c. Cd flowcell protein concentrations raw data for day 135.

Standard Conc. (g/ml)	Protein Mass in Standard (µg)	Abs at 562nm
0	0	0.056335
0.05	2.456342	0.071328
0.1	4.912685	
0.5	24.56342	0.189567
0.8	39.30148	0.275375
1	49.12685	0.327206



**Trendline Equations Used:**  
**day 135:**

$$P = \frac{Abs - 0.0566}{0.0055}$$

where  
P = protein mass (µg)  
Abs = absorbance reading

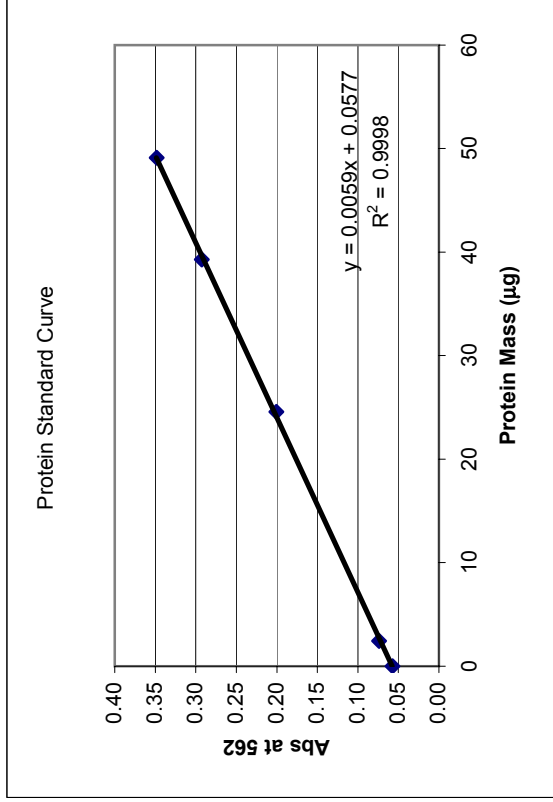
Location (day 135)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.11366	10.37544	207.5087	0.5387	0.5316855	390.2847	0.986979	0.014869
F1b	0.11366	10.37544	207.5087	0.583	0.5754086	360.6284	0.947722	0.046777
F2a	0.07951	4.164641	83.29281	0.4279	0.4055301	205.3924	0.946541	0.001773
F2b	0.07945	4.1549	83.098	0.4838	0.4585077	181.2358	0.976025	0.003745
F3a	0.08441	5.057092	101.1418	0.4703	0.4451584	227.2042		
F3b	0.08232	4.676022	93.52044	0.4283	0.4054037	230.6847		
F4a	0.11368	10.37895	207.579	0.5315	0.5187572	400.1466		
F4b	0.10907	9.539248	190.785	0.5523	0.5390585	353.9226		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	375.4566	20.9702
2	193.3141	17.0813
3	228.9445	2.46114
4	377.0346	32.6854

Appendix F

Table F.9d. Cd flowcell protein concentrations raw data for day 149.

Standard Conc. (g/ml)	Protein Mass in Standard (µg)	Abs at 562nm
0	0	0.057202
0.05	2.456342	0.073815
0.1	4.912685	
0.5	24.56342	0.2006
0.8	39.30148	0.292748
1	49.12685	0.348443



**Trendline Equations Used:**

day 149:

$$P = \frac{Abs - 0.0577}{0.0059}$$

where

P = protein mass (µg)

Abs = absorbance reading

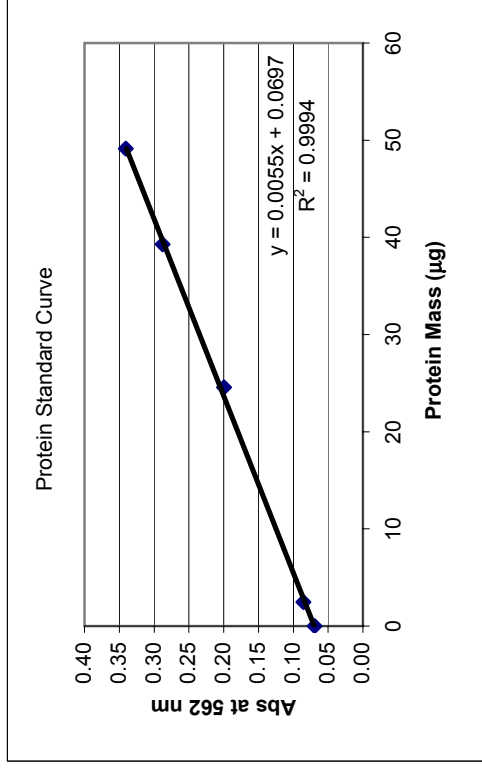
Location (day 149)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.09880	6.966536	139.3307	0.5855	0.5760266	241.8824	0.98382	0.015779
F1b	0.10875	8.652105	173.0421	0.5465	0.5376577	321.8444	0.921243	0.005188
F2a	0.08754	5.057205	101.1441	0.5167	0.4760063	212.4848	0.982322	0.010257
F2b	0.08633	4.852977	97.05955	0.4273	0.3936472	246.5648	0.950582	0.000749
F3a	0.09698	6.657107	133.1421	0.4302	0.4225948	315.0586		
F3b	0.08257	4.215224	84.30448	0.4328	0.4251488	198.294		
F4a	0.11198	9.200179	184.0036	0.424	0.4030467	456.5317		
F4b	0.11395	9.533612	190.6722	0.5954	0.5659764	336.8908		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	281.8634	56.5417
2	229.5248	24.0982
3	256.6763	82.565
4	396.7112	84.5989

Appendix F

Standard Conc. (g/ml)	Protein Mass in Standard (µg)	Abs at 562nm
0	0	0.069503
0.05	2.456342	0.085721
0.1	4.912685	
0.5	24.56342	0.199673
0.8	39.30148	0.287689
1	49.12685	0.340629

Table F.9e. Cd flowcell protein concentrations raw data for day 170.



Trendline Equations Used:

day 170:

$$P = \frac{Abs - 0.0697}{0.0055}$$

where

P = protein mass (µg)

Abs = absorbance reading

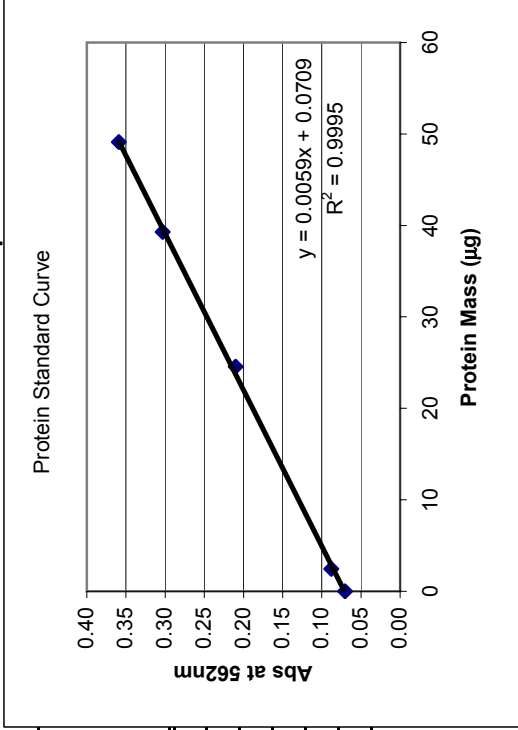
Location (day 170)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.14441	13.58311	271.6621	0.5709	0.5707874	475.9427	0.999803	0.000279
F1b	0.13175	11.28237	225.6474	0.4898	0.4897034	460.7838	0.974012	0.031053
F2a	0.12789	10.5798	211.5961	0.583	0.5678492	372.6273	0.98742	0.01734
F2b	0.11985	9.118147	182.3629	0.5297	0.5159343	353.4615	0.974381	0.003512
F3a	0.11157	7.612975	152.2595	0.5739	0.5666803	268.6867		
F3b	0.12144	9.406654	188.1331	0.5351	0.5283685	356.0642		
F4a	0.18761	21.43839	428.7677	0.5953	0.5800492	739.192		
F4b	0.10786	6.938704	138.7741	0.5496	0.53552	259.1389		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	468.3633	10.719
2	363.0444	13.5522
3	312.3755	61.7852
4	499.1655	339.449

Appendix F

Table F.9f. Cd flowcell protein concentrations raw data for day 191.

Standard Conc. (g/ml)	Protein Mass in Standard (µg)	Abs at 562nm
0	0	0.070443
0.05	2.456342	0.08789
0.1	4.912685	
0.5	24.56342	0.21002
0.8	39.30148	0.303302
1	49.12685	0.359301



**Trendline Equations Used:**  
**day 191:**

$$P = \frac{Abs - 0.0709}{0.0059}$$

where  
P = protein mass (µg)  
Abs = absorbance reading

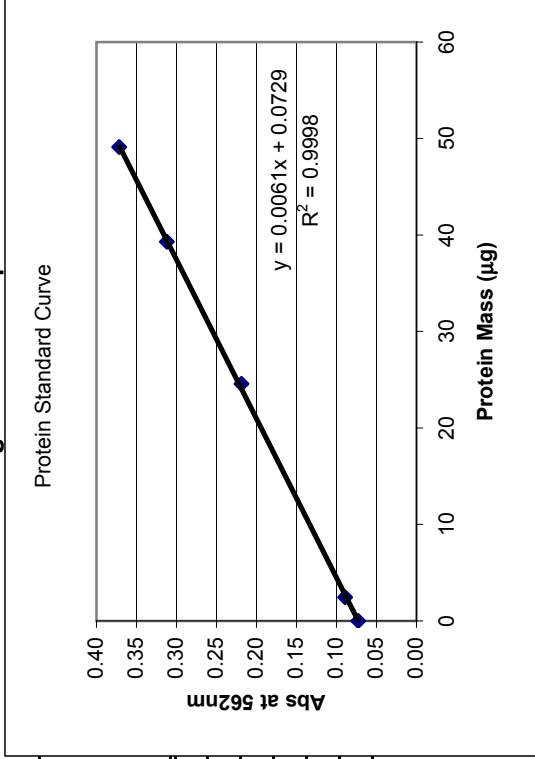
Location (day 191)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.11084	6.769481	135.3896	0.5697	0.5527453	244.9404	0.970239	0.00899
F1b	0.10970	6.576334	131.5267	0.5205	0.5050095	260.444	0.93882	0.01529
F2a	0.13447	10.77499	215.4997	0.5328	0.500203	430.8245	0.951959	0.006982
F2b	0.13296	10.51844	210.3689	0.5304	0.4979499	422.47	0.982627	0.017854
F3a	0.11155	6.890188	137.8038	0.5876	0.5593712	246.3548		
F3b	0.11993	8.311002	166.22	0.5365	0.5107261	325.4583		
F4a	0.13770	11.32198	226.4396	0.5601	0.5503694	411.432		
F4b	0.12756	9.603789	192.0758	0.5406	0.5312082	361.5829		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	252.6922	10.9627
2	426.6472	5.90756
3	285.9065	55.9346
4	386.5074	35.2487

Appendix F

Table F.9g. Cd flowcell protein concentrations raw data for day 275.

Standard Conc. (g/ml)	Protein Mass in Standard (µg)	Abs at 562nm
0	0	0.072858
0.05	2.456342	0.0893
0.1	4.912685	
0.5	24.56342	0.218696
0.8	39.30148	0.3118
1	49.12685	0.371752



**Trendline Equations Used:**  
day 275:

$$P = \frac{Abs - 0.0729}{0.0061}$$

where  
P = protein mass (µg)  
Abs = absorbance reading

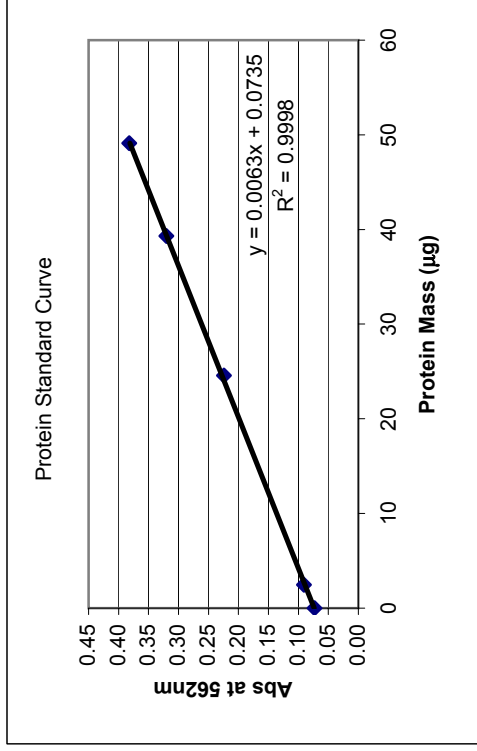
Location (day 275)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.11095	6.238487	124.7697	0.4561	0.4205232	296.7012	0.921998	0.008307
F1b	0.13149	9.604598	192.092	0.4786	0.4412681	435.318	0.918267	0.006564
F2a	0.13282	9.823329	196.4666	0.4506	0.4137709	474.8197	0.916341	0.004907
F2b	0.18386	18.18935	363.787	0.4922	0.4519708	804.8905	0.944505	0.030645
F3a	0.12618	8.734136	174.6827	0.4872	0.4464412	391.2783		
F3b	0.12927	9.240429	184.8086	0.4656	0.4266482	433.1639		
F4a	0.14718	12.17642	243.5283	0.5146	0.4860421	501.0437		
F4b	0.14613	12.00509	240.1017	0.5493	0.5188164	462.7875		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	366.0096	98.0168
2	639.8551	233.395
3	412.2211	29.6176
4	481.9156	27.0513

Appendix F

Table F.9h. Cd column protein concentrations raw data for day 276.

Standard Conc. (g/ml)	Protein Mass in Standard (µg)	Abs at 562nm
0	0	0.073252
0.05	2.456342	0.090621
0.1	4.912685	
0.5	24.56342	0.224276
0.8	39.30148	0.320337
1	49.12685	0.382189



**Trendline Equations Used:**  
day 276:

$$P = \frac{Abs - 0.0735}{0.0063}$$

where  
P = protein mass (µg)  
Abs = absorbance reading

Location (day 275)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
Inf a	0.1373	10.13452	202.6904	0.5656	0.4567037	443.8116	0.807468	0.000707
Inf b	0.1247	8.133062	162.6612	0.4765	0.3847584	422.762	0.805048	0.001417
F1a	0.0856	1.925766	38.51531	0.5188	0.4176591	92.21712	0.80189	0.000348
F1b	0.0850	1.822056	36.44113	0.5232	0.4212013	86.51714	0.800424	0.00253
F2a	0.0871	2.163536	43.27072	0.4727	0.3790535	114.1547	0.803847	0.003475
F2b	0.0868	2.104742	42.09483	0.4775	0.3829025	109.9362	0.801629	0.00293
F3a	0.0831	1.517593	30.35185	0.5364	0.4293475	70.69298		
F3b	0.0879	2.281287	45.62573	0.4984	0.3989314	114.3699		
F4a	0.0769	0.544339	10.88679	0.5657	0.4547363	19.24481		
F4b	0.0782	0.752819	15.05639	0.5703	0.458434	26.40082		
Eff a	0.0817	1.307742	26.15484	0.4691	0.376044	55.75536		
Eff b	0.0801	1.050122	21.00245	0.5295	0.4244623	39.66467		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
inf	433.2868	14.8843
1	89.36713	4.03049
2	112.0454	2.98294
3	92.53143	30.8842
4	22.82281	5.06006
eff	47.71002	11.3778