

Appendix D

Table D.8. Benzene column volatile solids (VS) data.

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	2.226111	0.761472	113	2.410684	0.878065	135	3.679949	0.683305	149	1.655641	0.160053
F2		#DIV/0!	#DIV/0!		2.818379	0.855268		3.14951	1.817378		1.853331	0.155072
F3		#DIV/0!	#DIV/0!		1.966399	0.73823		2.581624	0.390742		1.053476	0.299313
F4		0.330615	#DIV/0!		2.751543	0.032847		3.210841	1.621589		1.853542	0.283922
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	3.836535	1.817992	191	1.993432	0.267133	275	2.938878	0.598432	276	3.799587	0.191898
F2		4.023736	2.051793		2.554038	0.69545		3.603851	2.787839		1.462964	0.28606
F3		2.827221	0.056628		1.997144	0.786616		4.172902	0.199722		1.308467	0.344727
F4		2.303285	0.659802		2.19305	0.1619		2.766733	0.566361		1.261901	0.279927
Eff												

Calculations

s = standard deviation of triplicate analysis

where

$x_i$  = single value

$\bar{x}$  = average of values

n = number of observations

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

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Table D.8a-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):**

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

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.**

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Table D.8a. Benzene 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
Benzene day 53	F1a	0.9849	2.5311	2.2907	2.2871	1.3022	2.764552	0.155478	0.844522
	F1b	0.9849	3.0473	2.7655	2.7625	1.7776	1.687669	0.136637	0.863363
	F2a	0.9808	2.5426	2.3279	2.3283	1.3475	-0.0004	0.13747	0.86253
	F2b	0.9849	2.7144	2.5082	2.5086	1.5237	-0.0004	0.119225	0.880775
	F3a	0.9835	2.0393	1.9004	1.9009	0.9174	-0.0005	0.131559	0.868441
	F3b	0.9868	2.4963	2.3208	2.3219	1.3351	-0.0011	0.116264	0.883736
	F4a	0.9892	2.2202	2.0374	2.0379	1.0487	-0.0005	0.148497	0.851503
	F4b	0.993	3.0851	2.8084	2.8078	1.8148	0.0006	0.132259	0.867741

Location	Average VS/ dry sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
1	2.23	0.76	0.853943	0.013323
2			0.871653	0.012901
3			0.876089	0.010815
4	0.33		0.859622	0.011482

Appendix D Table D.8a. Benzene 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
Benzene day 113	F1a	0.9859	2.1721	2.1659	2.1645	1.1786	0.0014	0.005227	0.994773
	F1b	0.9843	2.18	2.1769	2.1716	1.1873	0.0053	0.002593	0.997407
	F2a	0.9848	1.7293	1.7254	1.7237	0.7389	0.0017	2.300717	0.005238
	F2b	0.9857	1.9184	1.8978	1.8967	0.911	0.0011	1.207464	0.022086
	F3a	0.9853	1.8436	1.8432	1.8417	0.8564	0.0015	1.751518	0.000466
	F3b	0.9824	1.8055	1.8053	1.8044	0.822	0.0009	1.094891	0.000243
	F4a	0.982	2.1416	2.1125	2.1108	1.1288	0.0017	1.506024	0.025095
	F4b	0.9784	1.8238	1.8218	1.8202	0.8418	0.0016	1.900689	0.002366

Location	Average VS/ wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
1	2.83	2.32	0.00391	0.001863
2	1.75	0.77	0.013662	0.011913
3	1.42	0.46	0.000355	0.000158
4	1.70	0.28	0.01373	0.016072

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Table D.8a. Benzene 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	
Benzene day 135	F1a	0.9807	1.8285	1.828	1.8253	0.8446	0.0027	3.19678	0.00059	0.99941
	F1b	0.9793	2.0421	2.0406	2.0362	1.0569	0.0044	4.163119	0.001411	0.998589
	F2a	0.9879	1.7133	1.7127	1.7095	0.7216	0.0032	4.43459	0.000827	0.999173
	F2b	0.9882	1.7554	1.7405	1.7391	0.7509	0.0014	1.864429	0.019421	0.980579
	F3a	0.9852	1.7307	1.7221	1.72	0.7348	0.0021	2.857921	0.011536	0.988464
	F3b	0.9859	1.7688	1.7685	1.7667	0.7808	0.0018	2.305328	0.000383	0.999617
	F4a	0.9844	2.2192	2.206	2.2007	1.2163	0.0053	4.357478	0.01069	0.98931
	F4b	0.9872	2.4496	2.395	2.3921	1.4049	0.0029	2.064204	0.037336	0.962664

Location	Average VS/ wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
1	3.68	0.68	0.001001	0.000581
2	3.15	1.82	0.010124	0.013148
3	2.58	0.39	0.00596	0.007886
4	3.21	1.62	0.024013	0.018841

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Table D.8a. Benzene 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
Benzene day 149	F1a	0.988	2.0269	2.0253	1.0373	0.0016	1.542466	0.002017	0.997983
	F1b	0.9901	2.1228	2.1208	1.1307	0.002	1.768816	0.00588	0.99412
	F2a	0.988	1.5631	1.5625	1.5615	0.5735	0.001	1.743679	0.001043
	F2b	0.9884	1.7035	1.703	1.7016	0.7132	0.0014	1.962984	0.000699
	F3a	0.9854	2.2836	2.2517	2.2501	1.2647	0.0016	1.265122	0.024572
	F3b	0.9861	2.0643	2.0561	2.0552	1.0691	0.0009	0.84183	0.007605
	F4a	0.9853	2.5258	2.4398	2.4374	1.4521	0.0024	1.652779	0.055826
	F4b	0.9874	2.143	2.1093	2.107	1.1196	0.0023	2.054305	0.029162

Location	Average VS/ wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
1	1.66	0.16	0.003949	0.002732
2	1.85	0.16	0.000871	0.000243
3	1.05	0.30	0.016089	0.011998
4	1.85	0.28	0.042494	0.018854

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Table D.8a. Benzene 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
Benzene day 170	F1a	0.9876	2.2435	2.2371	1.2495	0.0064	5.122049	0.049065	0.950935
	F1b	0.9899	2.0903	2.0875	1.0976	0.0028	2.55102	0.011853	0.988147
	F2a	0.9883	2.6442	2.5127	2.5044	1.5161	0.0083	5.474573	0.079413
	F2b	0.9894	2.5779	2.5091	2.5052	1.5158	0.0039	2.572899	0.043311
	F3a	0.986	2.0626	1.9934	1.9906	1.0046	0.0028	2.787179	0.064276
	F3b	0.9859	2.2752	2.1751	2.1717	1.1858	0.0034	2.867263	0.077639
	F4a	0.9844	2.5466	2.4571	2.4544	1.47	0.0027	1.836735	0.057291
	F4b	0.987	2.1336	2.1093	2.1062	1.1192	0.0031	2.769836	0.021193

Location	Average VS/ wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
1	3.84	1.82	0.030459	0.026312
2	4.02	2.05	0.061362	0.025528
3	2.83	0.06	0.070958	0.009449
4	2.30	0.66	0.039242	0.025525

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Table D.8a. Benzene 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	
Benzene day 191	F1a	0.9884	2.0541	1.9987	1.9965	1.0081	0.0022	2.182323	0.051985	0.948015
	F1b	0.9911	2.0878	2.0459	2.044	1.0529	0.0019	1.80454	0.038206	0.961794
	F2a	0.9899	1.9579	1.912	1.9092	0.9193	0.0028	3.045796	0.047417	0.952583
	F2b	0.9886	1.977	1.9604	1.9584	0.9698	0.002	2.062281	0.016795	0.983205
	F3a	0.9865	2.0279	1.9681	1.9656	0.9791	0.0025	2.553365	0.057423	0.942577
	F3b	0.9868	1.8476	1.8208	1.8196	0.8328	0.0012	1.440922	0.031134	0.968866
	F4a	0.9851	1.4678	1.4672	1.4662	0.4811	0.001	2.07857	0.001243	0.998757
	F4b	0.9877	1.466	1.4655	1.4644	0.4767	0.0011	2.307531	0.001045	0.998955

Location	Average VS/ wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
1	1.99	0.27	0.0451	0.0097
2	2.55	0.70	0.0321	0.0217
3	2.00	0.79	0.0443	0.0186
4	2.19	0.16	0.0011	0.0001

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Table D.8a. Benzene 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	
Benzene day 275	F1a	0.9791	2.0161	1.9355	1.9331	0.954	0.0024	2.515723	0.077724	0.922276
	F1b	0.9906	2.3576	2.2142	2.2101	1.2195	0.0041	3.362034	0.104901	0.895099
	F2a	0.9887	1.8275	1.7863	1.785	0.7963	0.0013	1.632551	0.049118	0.950882
	F2b	0.9822	1.8959	1.866	1.8611	0.8789	0.0049	5.575151	0.032724	0.967276
	F3a	0.9858	2.4953	2.3593	2.3534	1.3676	0.0059	4.314127	0.090096	0.909904
	F3b	0.9871	2.5082	2.3817	2.3761	1.389	0.0056	4.031677	0.083164	0.916836
	F4a	0.9853	2.0215	1.9596	1.9573	0.972	0.0023	2.366255	0.059738	0.940262
	F4b	0.9878	2.1584	2.0647	2.0613	1.0735	0.0034	3.16721	0.080044	0.919956

Location	Average VS/ wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
1	2.94	0.60	0.0913	0.0192
2	3.60	2.79	0.0409	0.0116
3	4.17	0.20	0.0866	0.0049
4	2.77	0.57	0.0699	0.0144

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Table D.8a. Benzene 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	
<b>Benzene day 276</b>	Inf a	0.9825	8.0929	6.9266	6.9033	5.9208	0.0233	3.9353	0.164027	0.835973
	Inf b	0.9716	7.892	6.7516	6.7305	5.7589	0.0211	3.6639	0.164788	0.835212
	F1a	0.9723	11.3188	9.3935	9.3795	8.4072	0.014	1.6652	0.186082	0.813918
	F1b	0.9732	11.3565	9.3919	9.3813	8.4081	0.0106	1.2607	0.189208	0.810792
	F2a	0.987	10.2845	8.5088	8.5008	7.5138	0.008	1.0647	0.190987	0.809013
	F2b	0.9854	11.1215	9.1799	9.1672	8.1818	0.0127	1.5522	0.191553	0.808447
	F3a	0.9827	8.8645	7.3807	7.3739	6.3912	0.0068	1.0640	0.188256	0.811744
	F3b	0.9791	13.5819	11.132	11.1172	10.1381	0.0148	1.4598	0.194393	0.805607
	F4a	0.9845	10.9052	9.0257	9.0191	8.0346	0.0066	0.8214	0.189452	0.810548
	F4b	0.9836	15.7095	12.8842	12.7983	11.8147	0.0859	7.2706	0.191859	0.808141
Eff a	0.9833	9.6791	7.9791	7.9649	6.9816	0.0142	2.0339	0.195497	0.804503	
Eff b	0.9942	11.5149	9.4495	9.4366	8.4424	0.0129	1.5280	0.196318	0.803682	

Location	Average VS/ wet sand (mg/g)	s of duplicate	average fraction of dry sand	s of dry sand fraction
Inf	3.7996	0.191898	0.164408	0.000538
1	1.46	0.29	0.187645	0.00221
2	1.31	0.34	0.19127	0.0004
3	1.26	0.28	0.191325	0.004339
4	4.05	4.56	0.190656	0.001702
Eff	1.7810	0.357737	0.195907	0.000581

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Table D.9. Benzene column carbohydrates concentrations.

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	30.72268	0.473642	113	108.6176	9.31648	135	119.8508	16.56772	149	129.7941	16.89287
F2		25.31091	1.073651		100.8586	7.84699		169.1883	27.84878		177.6925	26.74988
F3		36.45035	2.943027		94.95362	14.03032		124.914	15.91513		136.342	16.16095
F4		36.03878	2.387204		80.02055	5.147892		114.4444	2.383572		126.8966	2.242045
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	114.3074	12.95073	191	132.4366	34.96426	275	205.243	23.32821	276	401.335	67.64412
F2		109.3801	21.85344		110.3808	20.05766		119.5053	16.85452		29.62792	9.336081
F3		160.3273	13.76816		172.9049	54.37202		157.2527	13.39277		34.77409	2.160547
F4		146.7901	26.10116		171.3612	50.09964		143.3774	20.62594		21.37195	0.474565
Eff											16.557	5.221652

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 D

Table D.9. 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:

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

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

$$x = 102.04y$$

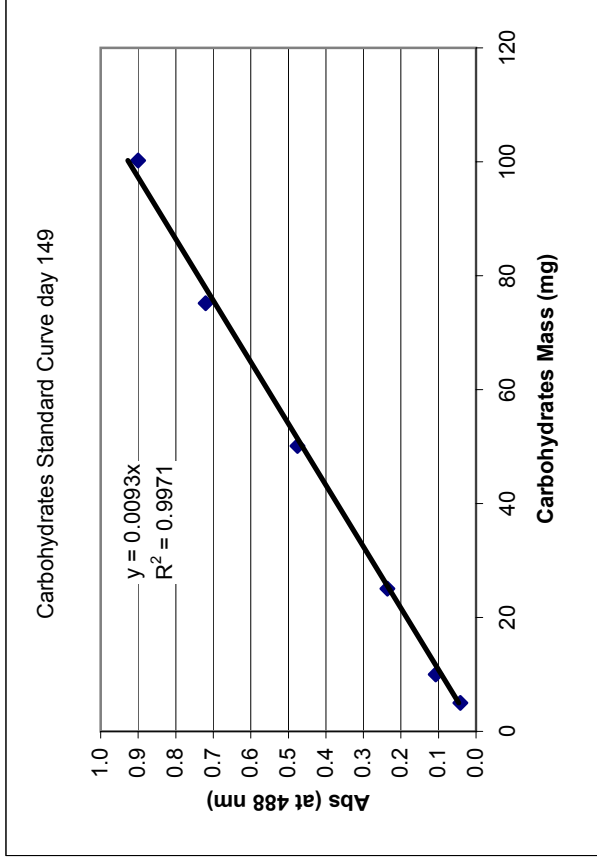
Analysis Note:

<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 1:2 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 D.9a. Benzene 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	-0.706	-0.707	0.002
	88.5	0.053	-0.708		
10 ug	75.5	0.122	-0.639	-0.642	0.004
	76.5	0.116	-0.645		
25 ug	55.5	0.256	-0.506	-0.513	0.011
	57.5	0.240	-0.521		
50 ug	33	0.481	-0.280	-0.273	0.009
	32	0.495	-0.267		
75 ug	18.5	0.733	-0.029	-0.029	
100 ug	13	0.886	0.125	0.151	0.038
	11.5	0.939	0.178		



Sample Name	%Trans	Abs.	Adjust	Mass		Conc.	Location	s dry sand		s
				carbs mass, µg	wet sand, g			dry sand, g	µg/g dry sand	
BenzFL1a	59	0.229	0.217	11.675	0.4499	0.384	BenzFL1a	0.854	30.39	0.474
BenzFL1b	60	0.222	0.210	11.282	0.4254	0.363	BenzFL2a	0.872	31.06	1.074
BenzFL2a	65.5	0.184	0.172	9.234	0.4315	0.376	BenzFL3a	0.876	24.55	2.943
BenzFL2b	66.5	0.177	0.165	8.881	0.3908	0.341	BenzFL4a	0.860	26.07	2.387
BenzFL3a	56.5	0.248	0.236	12.686	0.4213	0.369			34.37	
BenzFL3b	52	0.284	0.272	14.623	0.4332	0.380			38.53	
BenzFL4a	54.5	0.264	0.252	13.527	0.4581	0.394			34.35	
BenzFL4b	53	0.276	0.264	14.179	0.4372	0.376			37.73	

**Appendix D**

Used same standard curve as day 53 and 149.

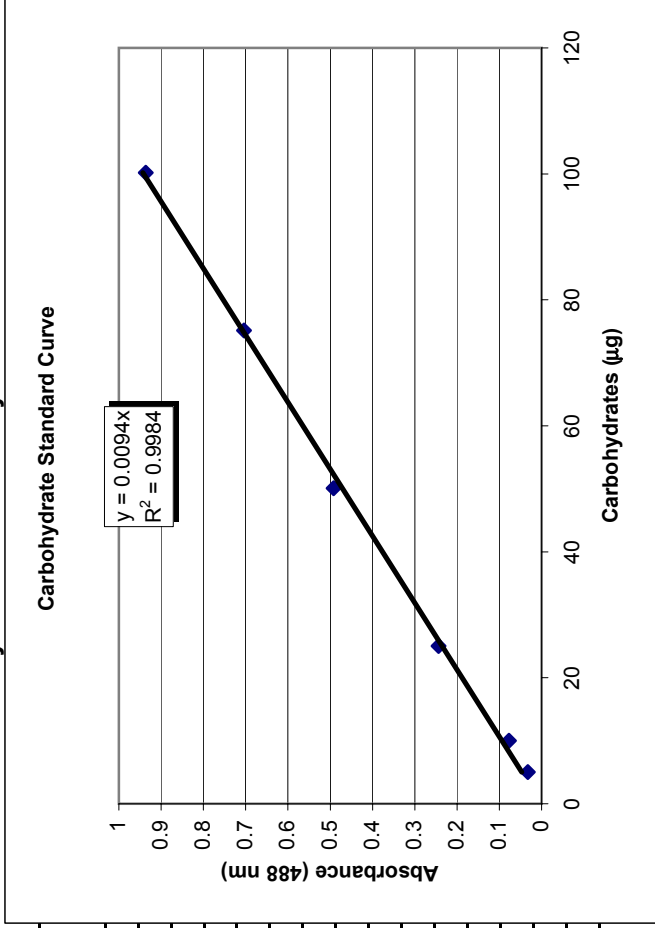
**Table D.9b. Benzene column carbohydrates raw data day 113.**

Sample Name	%Trans	Abs.	Adjust	Mass			Conc. $\mu\text{g/g dry sand}$	Location	average fraction of dry sand	s dry sand fraction	Ave. $\mu\text{g/g sand}$	s
				carbs mass, $\mu\text{g}$	wet sand, g	dry sand, g						
BenzFL1a	9	1.046	1.034	55.578	0.5468	0.545	102.04	BenzFL1a	0.996	0.002	108.631	9.318
BenzFL1b	10.5	0.979	0.967	51.979	0.4529	0.451	115.22	BenzFL2a	0.986	0.012	100.871	7.845
BenzFL2a	14	0.854	0.842	45.262	0.4814	0.475	95.32	BenzFL3a	1.000	0.000	94.966	14.031
BenzFL2b	7	1.155	1.143	61.446	0.5854	0.577	106.42	BenzFL4a	0.986	0.016	80.034	5.150
BenzFL3a	14	0.854	0.842	45.262	0.5324	0.532	85.05					
BenzFL3b	10.2	0.991	0.979	52.656	0.5022	0.502	104.89					
BenzFL4a	15.5	0.810	0.798	42.885	0.5692	0.561	76.39					
BenzFL4b	18.5	0.733	0.721	38.754	0.4696	0.463	83.67					

Appendix D

Table D.9c. Benzene 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	-0.675	-0.675	
10 ug	73.5	0.134	-0.628	-0.631	0.004
	74.5	0.128	-0.634		
25 ug	50	0.301	-0.460	-0.465	0.006
	51	0.292	-0.469		
50 ug	28.5	0.545	-0.216	-0.216	
75 ug	18	0.745	-0.017	-0.004	0.018
	17	0.770	0.008		
100 ug	10	1.000	0.239	0.228	0.015
	10.5	0.979	0.217		

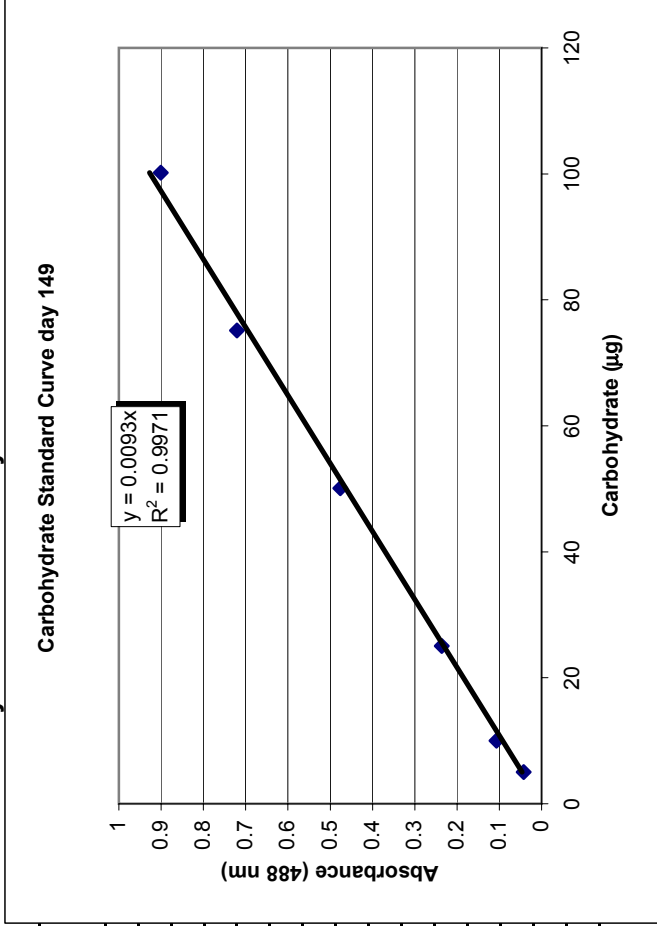


Sample Name	%Trans	Abs.	Adjust	Mass		Conc.	Location	average fraction of dry sand	s dry sand fraction	Ave. (µg/g sand)	s
				carbs mass, µg	wet sand, g						
BenzFL1a	19.5	0.710	0.657	69.890	0.5315	131.6274	BenzFL1a	0.998999	0.000581	119.91	16.56844
BenzFL1b	25	0.602	0.549	58.411	0.5404	108.1961	BenzFL2a	0.989876	0.013148	169.25	27.84033
BenzFL2a	8	1.097	1.044	111.054	0.5938	188.9359	BenzFL3a	0.99404	0.007886	124.98	15.91447
BenzFL2b	18.5	0.733	0.680	72.322	0.4885	149.5637	BenzFL4a	0.975987	0.018841	114.51	2.38203
BenzFL3a	19.5	0.710	0.657	69.890	0.5161	136.2313					
BenzFL3b	25.5	0.593	0.540	57.496	0.5086	113.7248					
BenzFL4a	26.5	0.577	0.524	55.719	0.506	112.8249					
BenzFL4b	24.5	0.611	0.558	59.344	0.5233	116.1936					

Appendix D

Table D.9d. 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	-0.706	-0.707	0.002
	88.5	0.053	-0.708		
10 ug	75.5	0.122	-0.639	-0.642	0.004
	76.5	0.116	-0.645		
25 ug	55.5	0.256	-0.506	-0.513	0.011
	57.5	0.240	-0.521		
50 ug	33	0.481	-0.280	-0.273	0.009
	32	0.495	-0.267		
75 ug	18.5	0.733	-0.029	-0.029	
100 ug	13	0.886	0.125	0.151	0.038
	11.5	0.939	0.178		

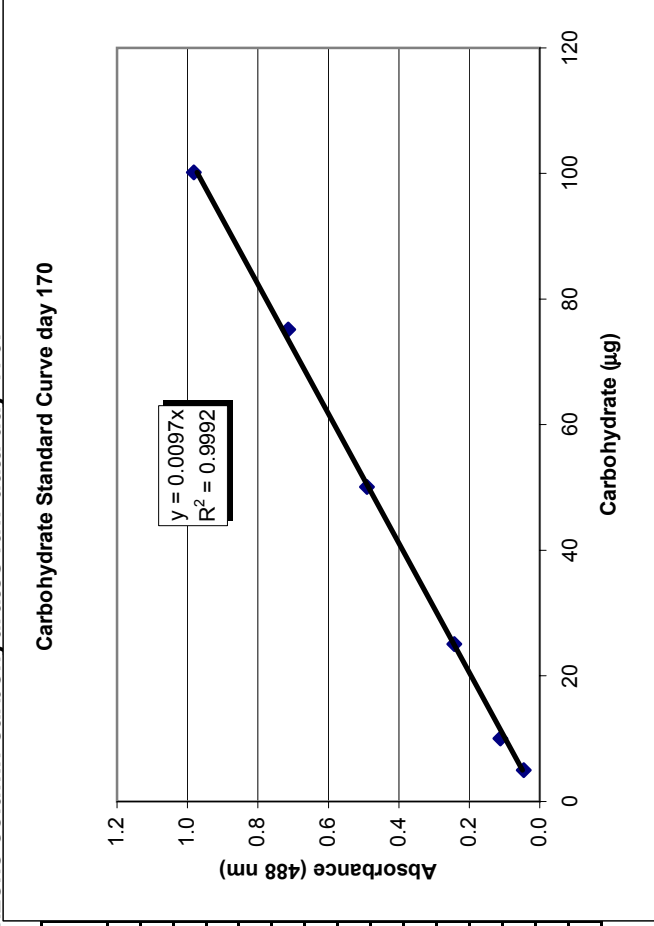


Sample Name	%Trans	Abs.	Adjust	Mass		Conc. µg/g dry sand	Location	average fraction of dry sand		s	
				carbs mass, µg	wet sand, g			s dry sand fraction	s		
BenzFL1a	19.5	0.710	0.698	75.050	0.5315	141.7642	BenzFL1a	0.996051	0.002732	129.82	16.89316
BenzFL1b	25	0.602	0.590	63.447	0.5404	117.8736	BenzFL2a	0.999129	0.000243	177.72	26.74648
BenzFL2a	8	1.097	1.085	116.657	0.5938	196.6299	BenzFL3a	0.983911	0.011998	136.37	16.16068
BenzFL2b	18.5	0.733	0.721	77.509	0.4885	158.8047	BenzFL4a	0.957506	0.018854	126.92	2.241405
BenzFL3a	19.5	0.710	0.698	75.050	0.5161	147.7957					
BenzFL3b	25.5	0.593	0.581	62.523	0.5086	124.941					
BenzFL4a	26.5	0.577	0.565	60.726	0.506	125.3386					
BenzFL4b	24.5	0.611	0.599	64.391	0.5233	128.5085					

Appendix D

Table D.9e. Benzene 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	-0.716	-0.708	0.010
	87	0.060	-0.701		
10 ug	76	0.119	-0.642	-0.642	0.000
	76	0.119	-0.642		
25 ug	55.5	0.256	-0.506	-0.512	0.008
	57	0.244	-0.517		
50 ug	31.5	0.502	-0.260	-0.263	0.005
	32	0.495	-0.267		
75 ug	19	0.721	-0.040	-0.040	
	19	0.721	-0.040		
100 ug	10.5	0.979	0.217	0.228	0.015
	10	1.000	0.239		

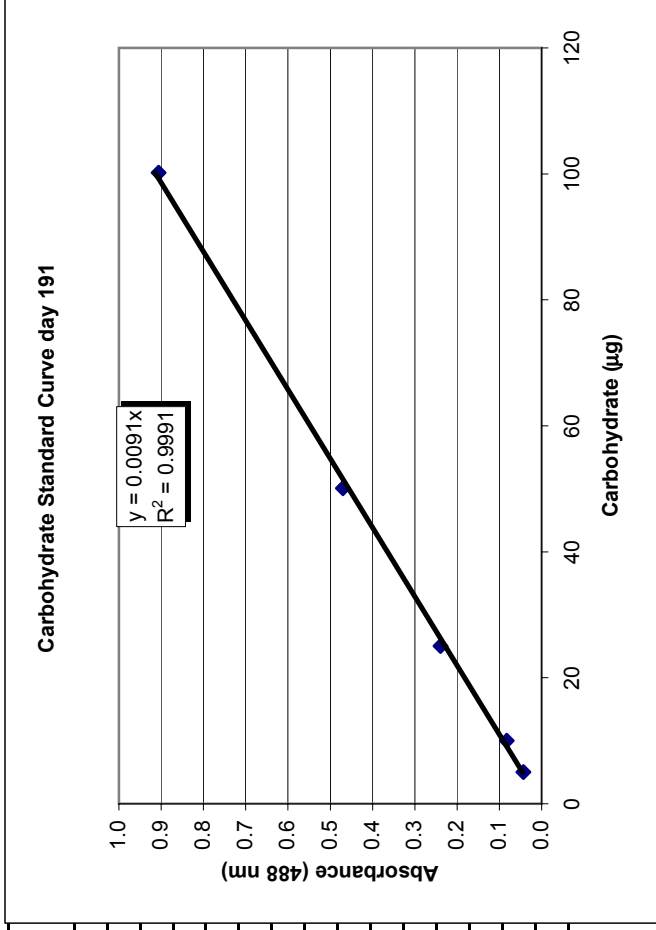


Sample Name	%Trans	Abs.	Adjust	Mass		Conc. µg/g dry sand	Location	average fraction of dry sand	s dry sand fraction	Ave. µg/g sand	s
				carbs mass, µg	wet sand, g						
BenzFL1a	25.5	0.593	0.585	60.357	0.5045	123.3951	BenzFL1a	0.969541	0.026312	114.24	12.94917
BenzFL1b	30	0.523	0.515	53.080	0.521	105.0823	BenzFL2a	0.938638	0.025528	109.31	21.84061
BenzFL2a	30	0.523	0.515	53.080	0.4533	124.7526	BenzFL3a	0.929042	0.009449	160.26	13.77038
BenzFL2b	31	0.509	0.501	51.612	0.5858	93.86527	BenzFL4a	0.960758	0.025525	146.72	26.09003
BenzFL3a	15	0.824	0.816	84.114	0.5326	169.9939					
BenzFL3b	20	0.699	0.691	71.234	0.5094	150.5196					
BenzFL4a	21	0.678	0.670	69.050	0.5603	128.2704					
BenzFL4b	20	0.699	0.691	71.234	0.4489	165.1672					

Appendix D

Table D.9f. Benzene 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	-0.703	-0.703	0.000
	87.5	0.058	-0.703		
10 ug	80	0.097	-0.665	-0.665	0.000
	80	0.097	-0.665		
25 ug	55.5	0.256	-0.506	-0.508	0.003
	56	0.252	-0.510		
50 ug	33.5	0.475	-0.287	-0.277	0.014
	32	0.495	-0.267		
75 ug	12	0.921	0.159	0.169	0.013
	11.5	0.939	0.178		
100 ug	12	0.921	0.159	0.159	0.000
	12	0.921	0.159		

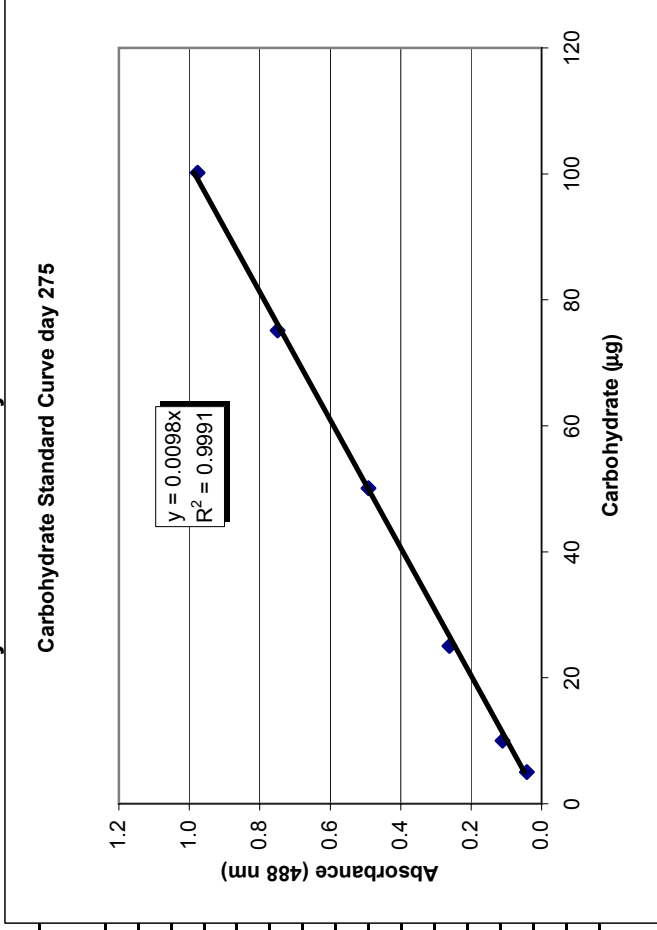


Sample Name	%Trans	Abs.	Adjust	Mass		Conc.	Location	average fraction of dry sand	s dry sand fraction	Ave. (µg/g sand)	s
				carbs mass, µg	wet sand, g						
BenzFL1a	22	0.658	0.643	70.613	0.4707	157.1013	BenzFL1a	0.954905	0.009743	132.38	34.95925
BenzFL1b	30.5	0.516	0.501	55.022	0.5352	107.6614	BenzFL2a	0.967894	0.021653	110.33	20.06135
BenzFL2a	24.5	0.611	0.596	65.476	0.5433	124.5135	BenzFL3a	0.955722	0.018589	172.85	54.36102
BenzFL2b	37	0.432	0.417	45.802	0.4922	96.14244	BenzFL4a	0.998856	0.00014	171.31	50.09803
BenzFL3a	15	0.824	0.809	88.891	0.4402	211.2889					
BenzFL3b	20	0.699	0.684	75.162	0.5851	134.4108					
BenzFL4a	21	0.678	0.663	72.833	0.5366	135.8861					
BenzFL4b	10.5	0.979	0.964	105.913	0.5129	206.7354					

Appendix D

Table D.9g. Benzene column carbohydrates raw data day 275.

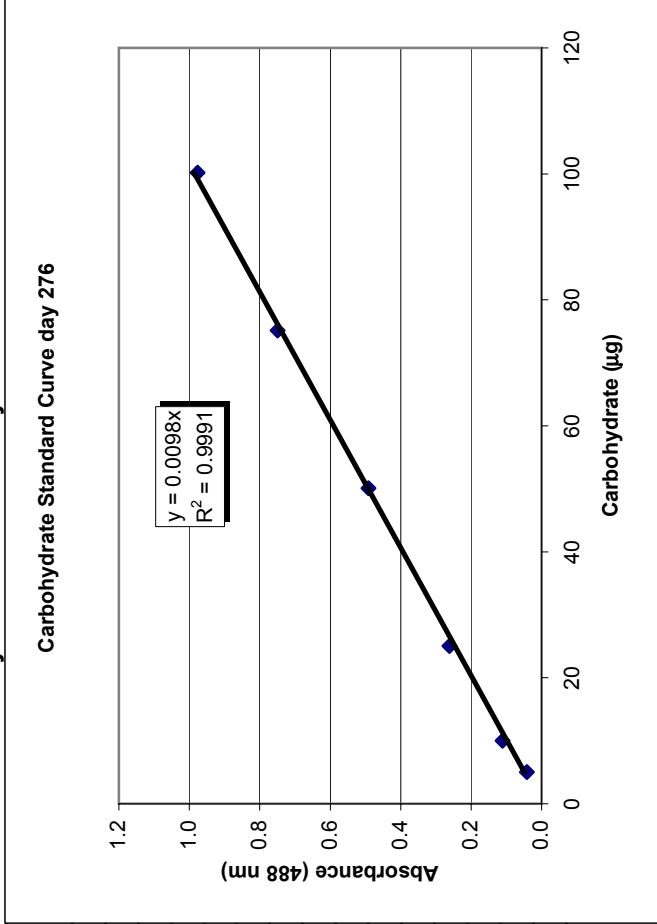
Standard	% Trans.	Abs.	Adjust	Ave.	Std Dev.
0 ug	95	0.022	0.014		
	97.5	0.011			
	98	0.009			
5 ug		#DIV/0!	#DIV/0!	-0.706	#DIV/0!
	88	0.056	-0.706		
10 ug	77	0.114	-0.648	-0.636	0.016
	73	0.137	-0.625		
25 ug	54	0.268	-0.494	-0.486	
	52	0.284	-0.477		
50 ug	30.5	0.516	-0.246	-0.256	0.015
	32	0.495	-0.267		
75 ug	17	0.770	0.008	0.002	0.009
	17.5	0.757	-0.005		
100 ug	9.5	1.022	0.261	0.229	0.045
	11	0.959	0.197		



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						
BenzFL1a	12	0.921	0.907	92.533	0.5395	188.75	BenzFL1a	0.908687	0.019217	205.25	23.32845
BenzFL1b	10.5	0.979	0.965	98.450	0.4886	221.74	BenzFL2a	0.959079	0.011592	119.51	16.85466
BenzFL2a	22	0.658	0.644	65.671	0.521	131.43	BenzFL3a	0.91337	0.004902	157.26	13.39277
BenzFL2b	26.5	0.577	0.563	57.424	0.5565	107.59	BenzFL4a	0.930109	0.014359	143.38	20.62582
BenzFL3a	15	0.824	0.810	82.644	0.5427	166.73					
BenzFL3b	18.5	0.733	0.719	73.350	0.5434	147.79					
BenzFL4a	23.5	0.629	0.615	62.748	0.5238	128.80					
BenzFL4b	15.5	0.810	0.796	81.191	0.5526	157.97					

Appendix D Table D.9g. Control 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!	-0.706	#DIV/0!
	88	0.056	-0.706		
10 ug	77	0.114	-0.648	-0.636	0.016
	73	0.137	-0.625		
25 ug	54	0.268	-0.494	-0.486	0.012
	52	0.284	-0.477		
50 ug	30.5	0.516	-0.246	-0.256	0.015
	32	0.495	-0.267		
75 ug	17	0.770	0.008	0.002	0.009
	17.5	0.757	-0.005		
100 ug	9.5	1.022	0.261	0.229	0.045
	11	0.959	0.197		



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						
Benz Inf a	2	1.699	0.937	95.663	0.4581	0.382785	Benz Inf	0.835592	0.000538	199.06	71.92225
Benz Inf b	5	1.301	0.540	55.057	0.4446	0.371504	BenzFL1a	0.812355	0.00221	-140.92	5.204054
BenzFL1a	53	0.276	-0.486	-49.566	0.4446	0.361173	BenzFL2a	0.80873	0.0004	-165.91	36.3392
BenzFL1b	54.5	0.264	-0.498	-50.803	0.4325	0.351344	BenzFL3a	0.808675	0.004339	-146.88	25.75954
BenzFL2a	68	0.167	-0.594	-60.610	0.5345	0.432266	BenzFL4a	0.809344	0.001702	-185.09	14.20104
BenzFL2b	80.5	0.094	-0.667	-68.089	0.4394	0.355356	Benz Eff	0.804093	0.000581	-184.06	30.72777
BenzFL3a	71	0.149	-0.613	-62.523	0.4683	0.378703				-165.10	
BenzFL3b	68	0.167	-0.594	-60.610	0.5825	0.471053				-128.67	
BenzFL4a	80.5	0.094	-0.667	-68.089	0.4806	0.388971				-175.05	
BenzFL4b	81.5	0.089	-0.673	-68.636	0.4346	0.351741				-195.13	
Benz Eff a	87.5	0.058	-0.703	-71.784	0.4338	0.348815				-205.79	
Benz Eff b	80	0.097	-0.665	-67.812	0.5195	0.417726				-162.34	

Appendix D

Table D.10. Benzene 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)
Inf									
F1	53	483.9766	212.2078	113	658.6638	63.10536	135	729.5639	158.4107
F2		172.6504	80.30697		676.1576	48.78269		779.8999	326.801
F3		404.5982	25.92872		525.0858	4.12893		580.3152	4.915897
F4		358.159	3.294052		570.1386	39.3597		778.1614	126.366
Eff									
							149		
								564.1259	47.39325
								786.5118	197.3292
								446.3285	6.57203
								767.8389	22.85633

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)
Inf									
F1	170	710.4082	83.14716	191	558.0685	50.23931	275	1017.408	126.2076
F2		478.2246	7.628796		726.8414	85.05718		593.0264	81.15234
F3		1029.869	174.2089		728.6874	0.247888		822.3113	33.80629
F4		748.731	104.7878		572.5175	88.85228		983.915	250.4
Eff									
							276		
								2000.686	126.2877
								312.4571	24.72806
								66.5434	22.23694
								50.65682	24.00965
								474.8408	5.353862
								177.599	19.52451

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 D

Table D.10a-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

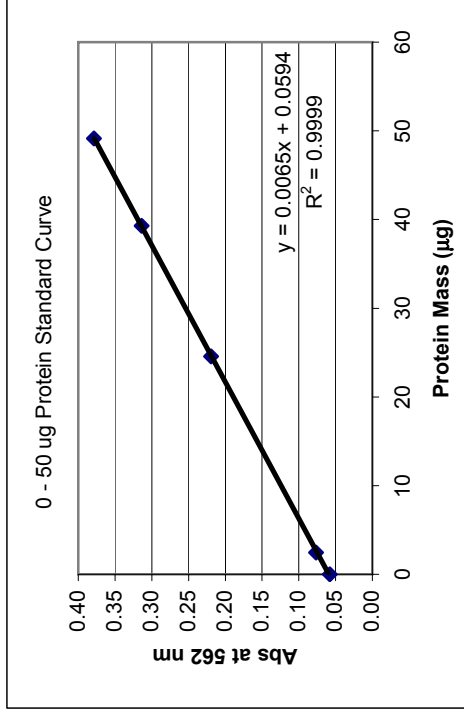
= average of values

n = number of observations

Appendix D

Table D.10a. Control column 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

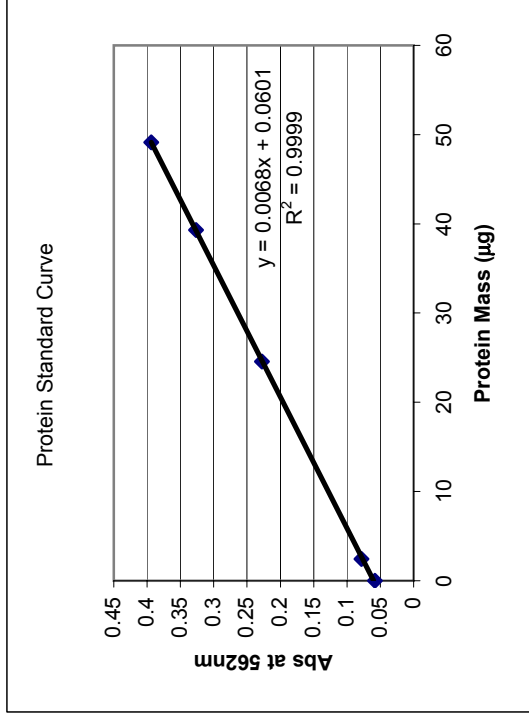
Location (day 53)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.11326	8.286515	165.7303	0.3061	0.261392	634.0301	0.853943	0.013323
F1b	0.10332	6.756654	135.1331	0.4739	0.404683	333.923	0.871653	0.012901
F2a	0.08890	4.538738	90.77476	0.4539	0.395643	229.436	0.876089	0.010815
F2b	0.07132	1.834048	36.68096	0.3632	0.316584	115.8648	0.859622	0.011482
F3a	0.10006	6.25535	125.107	0.3697	0.32389	386.2639		
F3b	0.10972	7.74215	154.843	0.4179	0.366117	422.9326		
F4a	0.10644	7.23733	144.7466	0.4671	0.401529	360.4883		
F4b	0.10625	7.208039	144.1608	0.4713	0.40514	355.8298		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
F1	483.9766	212.2078
F2	172.6504	80.30697
F3	404.5982	25.92872
F4	358.159	3.294052

Appendix D

Table D.10b. Benzene column 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

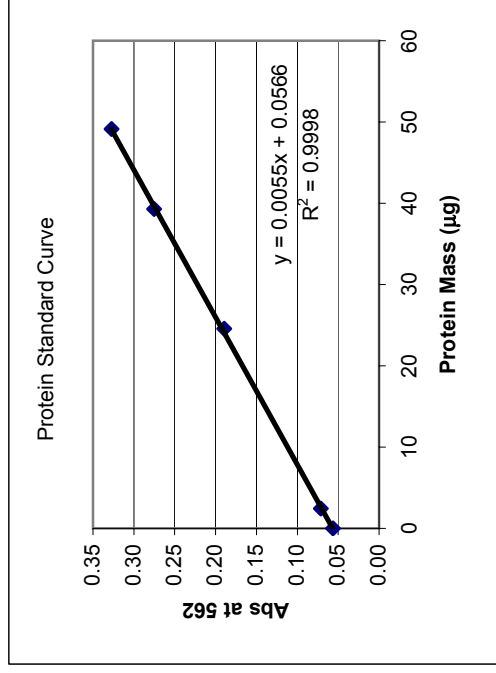
Location (day 113)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.17702	17.19466	343.8933	0.4909	0.488981	703.286	0.99609	0.001863
F1b	0.18277	18.04035	360.8069	0.5899	0.587594	614.0415	0.986338	0.011913
F2a	0.17910	17.49958	349.9917	0.553	0.545445	641.663	0.999645	0.000158
F2b	0.19435	19.74206	394.8411	0.5633	0.555604	710.6521	0.98627	0.016072
F3a	0.16257	15.06921	301.3842	0.571	0.570798	528.0054		
F3b	0.15899	14.54239	290.8479	0.5572	0.557002	522.1662		
F4a	0.16807	15.87735	317.547	0.5937	0.585548	542.3071		
F4b	0.16373	15.23939	304.7879	0.5168	0.509704	597.9701		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	658.6638	63.10536
2	676.1576	48.78269
3	525.0858	4.12893
4	570.1386	39.3597

Appendix D

Table D.10c. Benzene column 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

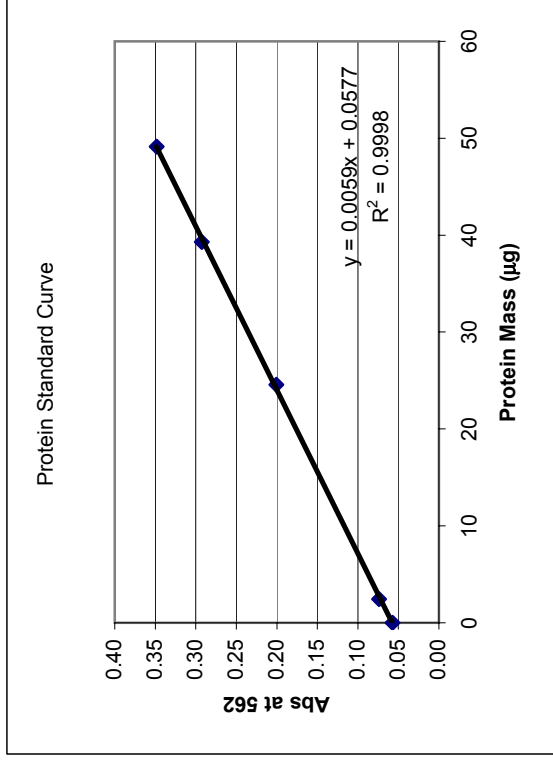
Location (day 135)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.17881	22.22063	444.4126	0.5286	0.528071	841.5772	0.998999	0.000581
F1b	0.14550	16.16364	323.2727	0.524	0.523476	617.5506	0.989876	0.013148
F2a	0.12725	12.84539	256.9078	0.4729	0.468112	548.8167	0.99404	0.007886
F2b	0.20876	27.66567	553.3134	0.5529	0.547302	1010.983	0.975987	0.018841
F3a	0.14416	15.92086	318.4173	0.5487	0.54543	583.7913		
F3b	0.13811	14.81956	296.3912	0.5169	0.51382	576.8391		
F4a	0.18811	23.91036	478.2072	0.5648	0.551237	867.5157		
F4b	0.16281	19.31087	386.2173	0.5745	0.560705	688.8072		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	729.5639	158.4107
2	779.8999	326.801
3	580.3152	4.915897
4	778.1614	126.366

Appendix D

Table D.10d. Benzene column 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

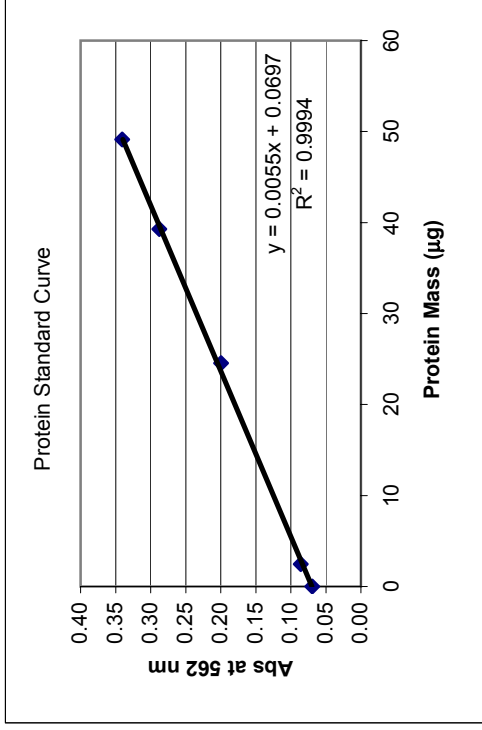
Location (day 149)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.15027	15.68907	313.7815	0.5937	0.591356	530.6139	0.996051	0.002732
F1b	0.15274	16.10822	322.1645	0.5412	0.539063	597.638	0.999129	0.000243
F2a	0.19480	23.23735	464.747	0.5023	0.501862	926.0446	0.983911	0.011998
F2b	0.15840	17.0686	341.3719	0.5281	0.52764	646.979	0.957506	0.018854
F3a	0.13606	13.28054	265.6108	0.5986	0.588969	450.9756		
F3b	0.13359	12.86343	257.2685	0.592	0.582475	441.6814		
F4a	0.17165	19.31409	386.2819	0.5367	0.513893	751.677		
F4b	0.17926	20.60256	412.0512	0.5489	0.525575	784.0008		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	564.1259	47.39325
2	786.5118	197.3292
3	446.3285	6.57203
4	767.8389	22.85633

Appendix D

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 D.10e. Benzene column 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

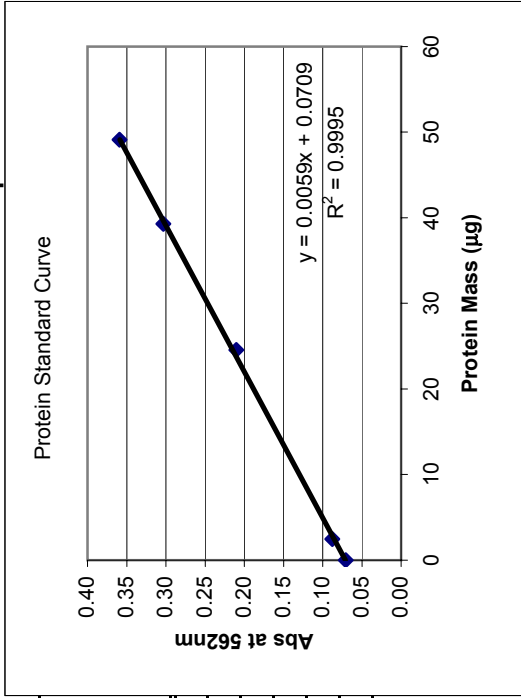
Location (day 170)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.15276	15.10238	302.0476	0.4781	0.463537	651.6143	0.969541	0.026312
F1b	0.17066	18.3572	367.144	0.4923	0.477305	769.2022	0.938638	0.025528
F2a	0.14038	12.85113	257.0226	0.5662	0.531457	483.619	0.929042	0.009449
F2b	0.13706	12.24711	244.9422	0.5519	0.518034	472.8302	0.960758	0.025525
F3a	0.21028	25.55968	511.1937	0.4772	0.443339	1153.054		
F3b	0.19187	22.21274	444.2548	0.5274	0.489977	906.6852		
F4a	0.16326	17.01098	340.2196	0.5249	0.504302	674.6348		
F4b	0.19268	22.36036	447.2072	0.5657	0.543501	822.8272		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	710.4082	83.14716
2	478.2246	7.628796
3	1029.869	174.2089
4	748.731	104.7878

Appendix D

Table D.10f. Benzene column 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

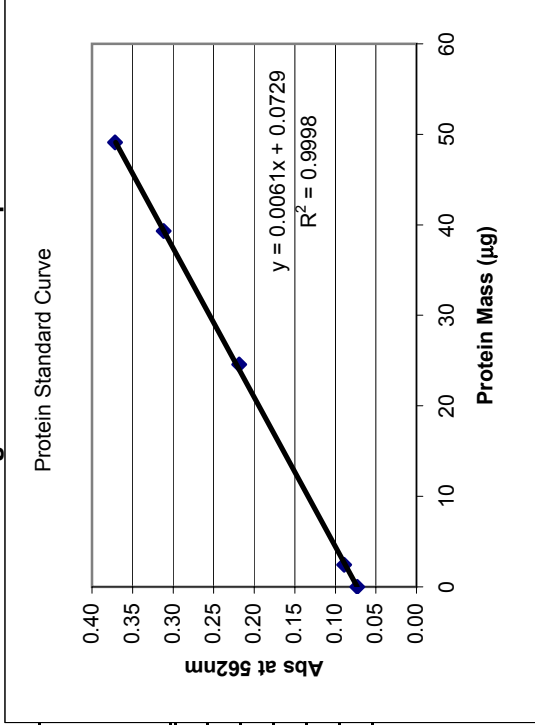
Location (day 191)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.16183	15.41197	308.2394	0.5438	0.519277	593.5931	0.954905	0.009743
F1b	0.15221	13.78182	275.6365	0.5524	0.527489	522.544	0.967894	0.021653
F2a	0.20204	22.22696	444.5391	0.5836	0.564863	786.9859	0.955722	0.018589
F2b	0.17855	18.24563	364.9125	0.5655	0.547344	666.6969	0.998856	0.00014
F3a	0.18167	18.77451	375.4902	0.5393	0.515421	728.5121		
F3b	0.19013	20.20807	404.1614	0.5802	0.55451	728.8626		
F4a	0.14020	11.74508	234.9016	0.4614	0.460872	509.6894		
F4b	0.18216	18.85769	377.1538	0.5943	0.59362	635.3455		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	558.0685	50.23931
2	726.8414	85.05718
3	728.6874	0.247888
4	572.5175	88.85228

Appendix D

Table D.10g. Benzene column 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

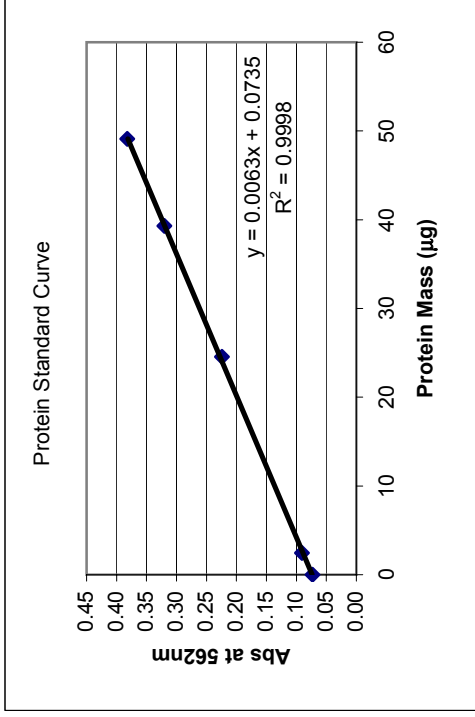
Location (day 275)	Average Abs at 562nm	Protein Mass (µg)	Account for 50µL transfer of 1 ml NaOH added	Wet Sand Mass (g)	Dry Sand Mass (g)	Protein conc. (µg protein/g wet sand)	average fraction of dry sand	s (in dry sand fraction)
F1a	0.23929	27.27687	545.5374	0.5425	0.492963	1106.65	0.908687	0.019217
F1b	0.22238	24.50535	490.1069	0.5811	0.528038	928.1657	0.959079	0.011592
F2a	0.16141	14.50946	290.1891	0.4652	0.446164	650.4098	0.91337	0.004902
F2b	0.15425	13.33627	266.7255	0.5192	0.497954	535.643	0.930109	0.014359
F3a	0.19053	19.28407	385.6813	0.499	0.455772	846.216		
F3b	0.18698	18.70138	374.0276	0.5129	0.468468	798.4067		
F4a	0.24515	28.23763	564.7526	0.523	0.486447	1160.975		
F4b	0.19584	20.1537	403.074	0.5371	0.499562	806.8555		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
1	1017.408	126.2076
2	593.0264	81.15234
3	822.3113	33.80629
4	983.915	250.4

Appendix D

Table D.10h. Benzene 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	0.386	49.676	993.513	0.569	0.475	2089.985	0.836	0.001
Inf b	0.333	41.126	822.527	0.515	0.430	1911.387	0.812	0.002
F1a	0.112	6.044	120.882	0.451	0.366	329.942	0.809	0.000
F1b	0.117	6.939	138.789	0.579	0.471	294.972	0.809	0.004
F2a	0.097	3.692	73.848	0.596	0.482	153.288	0.809	0.002
F2b	0.098	3.916	78.312	0.609	0.493	158.925	0.804	0.001
F3a	0.090	2.623	52.462	0.598	0.483	108.576		
F3b	0.085	1.886	37.728	0.497	0.402	93.833		
F4a	0.089	2.411	48.217	0.586	0.474	82.267		
F4b	0.081	1.265	25.298	0.498	0.403	50.820		
Eff a	0.080	0.986	19.713	0.585	0.471	33.679		
Eff b	0.084	1.660	33.202	0.491	0.395	67.634		

Flowcell	Avg. Protein conc. (µg protein/g wet sand)	s (of duplicate)
inf	2000.686	126.288
1	312.457	24.728
2	156.107	3.986
3	101.204	10.425
4	66.543	22.237
eff	50.657	24.010