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APPENDICES

APPENDIX A

EXPERIMENTAL DATA

Table A-1 THMs value for all fractions of shrimp farm effluents

farm No 1	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	1223.12	1223.12	0	0	0
filtrated	1357.13	1293.31	63.81	0	0

farm No 2	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	864.28	692.58	133.32	26.89	11.49
filtrated	893.30	843.66	49.63	0	0

farm No 3	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	902.25	411.95	427.62	62.68	0
filtrated	992.70	180.01	626.64	186.05	0

farm No 4	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	1337.59	16.20	128.51	370.73	822.15
filtrated	2027.04	19.31	150.91	506.06	1350.76

farm No 5	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	1432.49	0	43.17	259.33	1129.99
filtrated	2093.00	0	40.02	305.71	1747.27

farm No 6	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	2201.50	0	34.27	301.15	1866.08
filtrated	2066.90	0	33.88	284.66	1748.36

farm No 7	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	1475.80	1119.62	259.43	63.52	0
filtrated	1308.80	902.87	318.54	78.42	0
hydrophobic	261.83	261.83	0	0	0
hydrophilic	966.44	555.28	310.24	95.27	5.65

farm No 8	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	1964.92	1122.85	595.13	226.70	20.24
filtrated	1325.33	355.18	530.25	353.06	86.83
hydrophobic	276.31	268.41	7.89	0	0
hydrophilic	847.63	163.55	427.68	256.40	0

farm No 9	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	1399.43	900.77	1399.43	900.77	1399.43
filtrated	1252.79	632.95	1252.79	632.95	1252.79
hydrophobic	362.84	357.34	362.84	357.34	362.84
hydrophilic	756.49	247.44	756.49	247.44	756.49

farm No 10	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	1683.05	1308.11	354.10	20.84	0
filtrated	811.83	411.82	295.88	104.14	0
hydrophobic	270.95	270.95	0	0	0
hydrophilic	700.03	243.48	313.77	142.78	0

farm No 11	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	1134.69	625.49	384.72	124.49	0
filtrated	1543.61	434.32	660.62	401.60	47.07
hydrophobic	111.10	111.10	0	0	0
hydrophilic	856.40	17.86	240.01	416.71	181.81

farm No 12	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	1102.94	658.36	432.31	0	12.27
filtrated	1685.70	408.82	700.32	474.11	102.44
hydrophobic	231.63	229.11	2.52	0	0
hydrophilic	1021.58	172.27	432.51	343.09	73.71

farm No 13	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	3345.71	75.36	309.17	872.15	2089.03
filtrated	2475.99	41.61	144.68	524.61	1765.08
hydrophobic	261.02	111.55	101.33	39.77	8.36
hydrophilic	1947.61	29.54	89.39	355.50	1473.18

farm No 14	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	2814.43	39.15	136.07	551.78	2087.43
filtrated	3105.01	28.51	70.32	445.49	2560.70
hydrophobic	459.17	50.95	163.73	180.21	64.28
hydrophilic	2279.80	26.27	51.69	319.62	1882.22

farm No 15	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	2467.32	131.98	401.34	775.44	1160.06
filtrated	2228.22	87.30	244.60	613.30	1283.01
hydrophobic	470.60	220.68	147.18	55.89	46.84
hydrophilic	2131.62	80.24	196.70	529.77	1324.92

farm No 16	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
raw water	1130.40	568.91	344.65	155.94	60.91
filtrated	1103.24	296.03	472.57	249.04	85.60
hydrophobic	388.88	258.96	48.62	35.96	45.33
hydrophilic	891.11	123.91	396.34	273.50	97.35

farm No 13 coagulation	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
filtrated	5605.00	64.50	337.33	1324.58	3878.59

farm No 14 coagulation	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
filtrated	5659.50	28.72	49.72	783.59	4797.47

farm No 15 coagulation	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
filtrated	1648.77	80.40	184.66	437.83	945.88

farm No 16 coagulation	THMs ($\mu\text{g/L}$)	Chloroform (CHCl_3)	Bromodichloromethane (CHCl_2Br)	Dibromochloromethane (CHClBr_2)	Bromoform (CHBr_3)
filtrated	743.01	144.70	303.43	211.09	83.79

Table A-2 THMs value for all fractions of River

River water	THMs	Chloroform	Bromodichloromethane	Dibromochloromethane	Bromoform
Upstream 1					
Raw River	128.1278	128.127805	0	0	0
Filtrated River	29.51679	29.51679	0	0	0
Upstream 2					
Raw River	258.5016	258.50156	0	0	0
Filtrated River	69.41302	69.41302	0	0	0
Upstream 3					
Raw River	282.6279	282.627915	0	0	0
Filtrated River	278.5943	278.594255	0	0	0
Downstream 1					
Raw River	329.00	257.98	47.43	12.79	10.808
Filtrated River	582.91	485.63	72.31	14.14	10.834
Downstream 2					
Raw River	517.22	404.47	96.14	13.96	2.65
Filtrated River	1007.07	858.35	135.81	10.29	2.62
Downstream 3					
Raw River	1091.454	0	65.28965	317.396	708.7687
Filtrated River	1103.154	0	53.7947	309.2678	740.0915

Table A-3 Surrogate parameters of shrimp farm effluents pre and post coagulation

Water Sources	Organic carbon (mg/L)	UV (1/cm)	SUVA (L/mg.m)
Farm No 13			
raw water	8.026	1.2430	15.487
filtrated	8.871	0.2930	3.303
coagulated	6.812	0.2640	3.876
Farm No 14			
raw water	4.742	0.4400	9.279
filtrated	4.410	0.2440	5.533
coagulated	3.243	0.1940	5.982
Farm No 15			
raw water	8.491	0.3450	4.063
filtrated	10.236	0.1950	1.905
coagulated	4.048	0.0525	1.297
Farm No 16			
raw water	7.787	0.2120	2.722
filtrated	8.300	0.1460	1.759
coagulated	5.832	0.0440	0.750

Table A-4 Linear regression of THMF_P, standardized THMs, and other parameters

Shrimp farm effluents	Dependent variable	Independent variable	Correlation coefficient (R)	Determination (R ²)	Standard error	Correlation coefficient	
						a	b
Raw water	THMF _P	Salinity	0.54417	0.29612	659.65202	1220.18290	86.65878
		TOC	0.07246	0.00525	826.98924	1666.18850	-10.66786
		UV	0.64796	0.41985	631.55532	773.78323	1786.27410
		SUVA	0.48402	0.23427	725.57131	1176.96440	65.57827
	THMs/TOC	Salinity	0.89793	0.80628	85.63673	78.72865	33.55491
		TOC	0.59261	0.35119	156.72399	417.72159	-20.47420
		UV	0.45710	0.20894	173.05426	79.63873	295.69215
		SUVA	0.75580	0.57123	127.40625	69.90788	24.02910
Filtrated water	THMF _P	Salinity	0.74570	0.55608	506.43444	1121.41250	108.86068
		DOC	0.19659	0.03865	745.26308	1842.08180	-31.30364
		UV	0.49254	0.24260	661.50211	423.66547	5366.81030
		SUVA	0.77292	0.59740	482.28651	672.00244	337.19931
	THMs/DOC	Salinity	0.90642	0.82160	92.76428	73.47229	38.23405
		DOC	0.60818	0.36989	174.33856	487.62279	-27.98181
		UV	0.19053	0.03630	215.60310	96.99026	599.85612
		SUVA	0.95888	0.91946	62.32983	-90.69819	120.87471
Hydrophobic	THMF _P	Salinity	0.52332	0.27386	126.13112	229.22810	19.75244
		DOC	0.44441	0.19750	132.59719	127.90983	48.53926
		UV	0.50272	0.25272	127.95372	186.75486	997.14909
		SUVA	0.52950	0.28037	125.56408	198.62459	28.89466
	THMs/hydrophobic	Salinity	0.58935	0.34733	43.53577	64.37198	8.09873
		DOC	0.17408	0.03030	53.06634	63.84823	6.92210
		UV	0.50515	0.25517	46.50814	51.13454	364.79058
		SUVA	0.62301	0.38814	42.15292	50.30695	12.37744
	THMs/DOC-hydrophobic	Salinity	0.82568	0.68175	16.61704	14.85046	6.20190
		DOC	0.27642	0.07641	28.30795	48.21457	-1.69426
		UV	0.76612	0.58693	18.93120	2.52745	302.40479
		SUVA	0.88227	0.77840	13.86602	3.78647	9.58091
Hydrophilic	THMF _P	Salinity	0.87436	0.76450	356.13271	695.90157	163.62354
		DOC	0.11259	0.01268	729.19366	946.98899	25.89776
		UV	0.70580	0.49816	519.87137	24.02188	11195.35000
		SUVA	0.82151	0.67487	418.44709	281.06112	593.22718
	THMs/hydrophilic	Salinity	0.94725	0.89729	60.97126	58.02278	45.95470
		DOC	0.24170	0.05842	184.60660	279.50644	-14.41246
		UV	0.47769	0.22818	167.13817	-14.39404	1964.27250
		SUVA	0.93323	0.87093	68.35009	-70.05060	174.72407
	THMs/DOC-hydrophilic	Salinity	0.96324	0.92783	40.69263	33.87741	37.20525
		DOC	0.33228	0.11041	142.86328	237.13484	-10.47320
		UV	0.49189	0.24195	131.87871	-26.73232	1610.38660
		SUVA	0.93468	0.87363	53.84461	-66.77177	139.32664

Table A-5 The relationship between coagulation dosages and relevant parameters

Farm No.13										
alum dose (mg/L)	pH	TOC (mg/L)	UV (1/cm)	SUVA(L/mg.m)	Turbidity (NTU)	Alkalinity	% removal NTU	TOC removal%	%SUVA	
0	8.17	8.026	1.243	15.487	58.180	180	0.000	0.000	0.000	
40	7.56	7.338	0.285	3.884	6.330		89.120	8.572	74.922	
60	7.25	6.812	0.264	3.876	4.250	150	92.695	15.126	74.976	
80	7.06	6.541	0.250	3.822	4.170		92.833	18.502	75.321	
100	6.86	6.147	0.235	3.823	5.920		89.825	23.411	75.315	
120	6.84	5.951	0.225	3.781	2.190		96.236	25.853	75.587	
Farm No 14										
alum dose (mg/L)	pH	TOC(mg/L)	UV (cm-1)	SUVA	Turbidity (NTU)	Alkalinity	% removal NTU	TOC removal%	%SUVA	
0	7.36	4.742	0.440		9.279	111.800	120	0.000	0.000	
40	6.88	3.675	0.210		5.714	5.080		95.456	22.501	
60	6.66	3.267	0.203		6.214	3.430		96.932	31.105	
80	6.51	3.263	0.202		6.191	2.560		97.710	31.189	
100	6.36	3.243	0.194		5.982	1.760	52.5	98.426	31.611	
120	6.21	3.151	0.175		5.554	4.680		95.814	33.551	
Farm No 15										
alum dose	pH	TOC	UV	SUVA	Turbidity	Alkalinity	% removal NTU	TOC removal%	%SUVA	
0	8.730	8.491	0.345		4.063	33.510	65	0.000	0.000	
40	6.890	6.328	0.210		3.319	6.260	60	90.10	26.27	
60	6.760	5.532	0.189		3.416	4.290	50	89.80	49.48	
80	6.240	4.907	0.161		3.281	2.970	37.5	90.21	65.02	
100	5.890	4.507	0.144		3.195	2.050	32.5	90.47	75.86	
120	5.710	4.704	0.144		3.061	3.370	22.5	90.86	60.31	
Farm No 16										
alum dose	pH	TOC	UV	SUVA	turbidity	Alkalinity	% removal NTU	TOC removal%	%SUVA	
0	9.91	7.787	0.212		2.722	49.000	90	0.000	0.000	
40	8.79	6.561	0.193		2.942	21.540	85	56.041	15.744	
60	8.3	5.926	0.176		2.970	22.900	72.5	53.265	23.899	
80	7.83	6.136	0.143		2.331	12.560	65	74.367	21.202	
100	7.25	5.681	0.104		1.831	3.520	55	92.816	27.045	
120	6.61	4.704	0.088		1.871	2.430	40	95.041	39.592	

Table A-6 Approximately chlorine demand of shrimp farm effluents

Farm No.	Chlorine demand (mg/L)			
	Raw water	Filtrated water	Hydrophobic	Hydrophilic
No.1	56	34		
No.2	52	27		
No.3	48	29		
No.4	45	24		
No.5	49	27		
No.6	45	18	2	21
No.7	36	26	6	16
No.8	86	45	8	18
No.9	79	39	6	24
No.10	91	29	9	22
No.11	71	48	7	29
No.12	75	60	5	16
No.13	98	95	6	20
No.14	97	93	8	14
No.15	101	100	2	10
No.16	91	86	4	24

APPENDIX B
STATISTICAL DATA

Table B-1 linear regression model THMFP and Salinity

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	Salinity		Stepwise (Criteria: Probability -of-F-to-e nter <= .050, Probability -of-F-to-r emove >= .100).

a. Dependent Variable: THMFP-filtrated

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.781 ^a	.610	.582	413.19630

a. Predictors: (Constant), Salinity

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3738666	1	3738666.079	21.898	.000 ^a
	Residual	2390237	14	170731.184		
	Total	6128903	15			

a. Predictors: (Constant), Salinity

b. Dependent Variable: THMFP-filtrated

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1246.438	133.465		9.339	.000
	Salinity	97.049	20.739	.781	4.680	.000

a. Dependent Variable: THMFP-filtrated

Excluded Variables^a

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics	
					Tolerance	
1	DOC	-.050 ^a	-.154	.880	-.043	.282
	UV(filtrated)	.048 ^a	.275	.787	.076	.991
	SUVA(filtrated)	-.047 ^a	-.097	.924	-.027	.127
	pH	.100 ^a	.534	.603	.146	.828

a. Predictors in the Model: (Constant), Salinity

b. Dependent Variable: THMFP-filtrated

Table B-2 linear regression model THMFP and SUVA

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	SUVA-filtrated	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: THMFP-filtrated

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.724 ^a	.524	.490	456.48876	.524	15.412	1	14	.002	.958

a. Predictors: (Constant), SUVA-filtrated

b. Dependent Variable: THMFP-filtrated

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3211555	1	3211554.817	15.412	.002 ^a
	Residual	2917348	14	208381.988		
	Total	6128903	15			

a. Predictors: (Constant), SUVA-filtrated

b. Dependent Variable: THMFP-filtrated

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	846.518	232.537		3.640	.003					
	SUVA-filtrated	289.025	73.622	.724	3.926	.002	.724	.724	.724	1.000	1.000

a. Dependent Variable: THMFP-filtrated

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	SUVA-filtrated
1	1	1.871	1.000	.06	.06
	2	.129	3.813	.94	.94

a. Dependent Variable: THMFP-filtrated

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1239.013	2468.746	1641.912	462.71336	16
Residual	-617.0722	831.0986	.0000	441.01004	16
Std. Predicted Value	-.871	1.787	.000	1.000	16
Std. Residual	-1.352	1.821	.000	.966	16

a. Dependent Variable: THMFP-filtrated

Table B-3 linear regression model THMFP and Conductivity

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	Conductivity		Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: THMFP-filtrated

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.731 ^a	.535	.502	451.31229	.535	16.090	1	14	.001	1.133

a. Predictors: (Constant), Conductivity

b. Dependent Variable: THMFP-filtrated

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3277344	1	3277343.710	16.090	.001 ^a
	Residual	2851559	14	203682.782		
	Total	6128903	15			

a. Predictors: (Constant), Conductivity

b. Dependent Variable: THMFP-filtrated

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1278.786	144.655		8.840	.000					
	Conductivity	4.788E-02	.012	.731	4.011	.001	.731	.731	.731	1.000	1.000

a. Dependent Variable: THMFP-filtrated

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	Conductivity
1	1	1.626	1.000	.19	.19
	2	.374	2.084	.81	.81

a. Dependent Variable: THMFP-filtrated

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1311.347	2796.738	1641.912	467.42869	16
Residual	-703.7377	874.7510	.0000	436.00909	16
Std. Predicted Value	-.707	2.471	.000	1.000	16
Std. Residual	-1.559	1.938	.000	.966	16

a. Dependent Variable: THMFP-filtrated

Table B-4 non-linear regression THMFP and ln salinity

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	ln salinity	.	Stepwise (Criteria: Probability -of-F-to-e nter <= .050, Probability -of-F-to-r emove >= .100).

a. Dependent Variable: ln THMFP-f

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.901 ^a	.811	.790	.1850497577	.811	38.631	1	9	.000	2.053

a. Predictors: (Constant), ln salinity

b. Dependent Variable: ln THMFP-f

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.323	1	1.323	38.631	.000 ^a
	Residual	.308	9	.034		
	Total	1.631	10			

a. Predictors: (Constant), ln salinity

b. Dependent Variable: ln THMFP-f

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	7.207	.067		107.678	.000					
	ln salinity	.241	.039	.901	6.215	.000	.901	.901	.901	1.000	1.000

a. Dependent Variable: ln THMFP-f

Excluded Variables^b

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics			
					Tolerance	VIF	Minimum Tolerance	
1	In bromide	.032 ^a	.128	.901	.045	.371	2.692	.371
	In chlorine	.012 ^a	.046	.964	.016	.341	2.934	.341
	In SUVA-filtrated	-.258 ^a	-.895	.397	-.302	.258	3.882	.258
	In UV filtrated	.082 ^a	.545	.601	.189	.998	1.002	.998
	In DOC	.237 ^a	1.019	.338	.339	.387	2.585	.387

a. Predictors in the Model: (Constant), In salinity

b. Dependent Variable: In THMFP-f

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	In salinity
1	1	1.552	1.000	.22	.22
	2	.448	1.862	.78	.78

a. Dependent Variable: In THMFP-f

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	6.916676	7.851441	7.328259	.34467026	16
Residual	-.384458	.2601901	.0057169	.19535584	16
Std. Predicted Value	-1.430	1.140	-.298	.948	16
Std. Residual	-2.078	1.406	.031	1.056	16

a. Dependent Variable: In THMFP-f

APPENDIX C

CALIBRATION DATA AND CURVE

Figure C-1 Calibration curve of GC/ECD

=====
 Calibration Table
 =====

Calib. Data Modified : Tuesday, October 07, 2003 6:13:24 PM
 Calculate : Internal Standard
 Based on : Peak Area
 Rel. Reference Window : 5.000 %
 Abs. Reference Window : 0.000 min
 Rel. Non-ref. Window : 5.000 %
 Abs. Non-ref. Window : 0.000 min
 Uncalibrated Peaks : not reported
 Partial Calibration : Yes, identified peaks are recalibrated
 Correct All Ret. Times: No, only for identified peaks

Curve Type : Linear
 Origin : Included
 Weight : Equal

Recalibration Settings:
 Average Response : Average all calibrations
 Average Retention Time: Floating Average New 75%

Calibration Report Options :
 Printout of recalibrations within a sequence:
 Calibration Table after Recalibration
 Normal Report after Recalibration
 If the sequence is done with bracketing:
 Results of first cycle (ending previous bracket)

Default Sample ISTD Information (if not set in sample table):

ISTD #	ISTD Amount [ng/ul]	Name
1	130.00000	Bromofluorobenzene

Signal 1: ECD1 B,

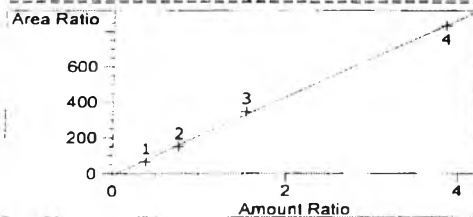
RetTime [min]	Lvl Sig	Amount [ng/ul]	Area	Amt/Area	Ref Grp	Name
1.350	1	1	50.00000	793.66138	6.29992e-2	1 Chloroform
		2	100.00000	1859.49878	5.37779e-2	
		3	200.00000	4340.40625	4.60786e-2	
		4	500.00000	1.01435e4	4.92925e-2	
1.737	1	1	50.00000	6013.35352	8.31483e-3	1 Bromodichloromethane
		2	100.00000	1.44008e4	6.94408e-3	

RetTime [min]	Lvl Sig	Amount [ng/ul]	Area	Amt/Area	Ref Grp Name
2.509	1	3 200.00000	3.23248e4	6.18720e-3	1 Dibromochloromethane
		4 500.00000	7.59195e4	6.58592e-3	
		1 50.00000	5140.76855	9.72617e-3	
		2 100.00000	1.25214e4	7.98631e-3	
3.654	1	3 200.00000	2.80932e4	7.11917e-3	1 Bromoform
		4 500.00000	6.89588e4	7.25071e-3	
		1 50.00000	1810.85266	2.76113e-2	
		2 100.00000	4585.95898	2.28000e-2	
4.323	1	3 200.00000	9802.58789	2.04028e-2	+I1 Bromofluorobenzene
		4 500.00000	2.51011e4	1.99194e-2	
		1 130.00000	12.24543	10.61621	
		2 130.00000	12.53398	10.37180	
		3 130.00000	12.57201	10.34043	
		4 130.00000	12.16011	10.69069	

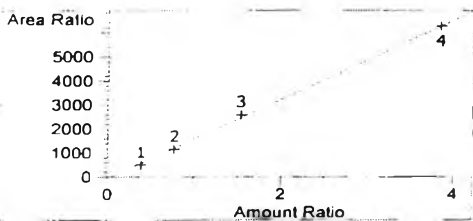
=====
Peak Sum Table
=====

No Entries in table
=====

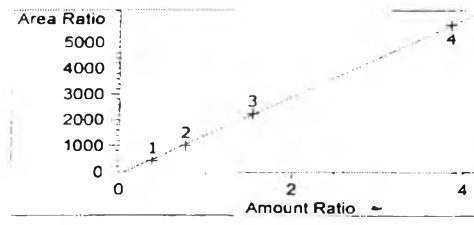
=====
Calibration Curves
=====



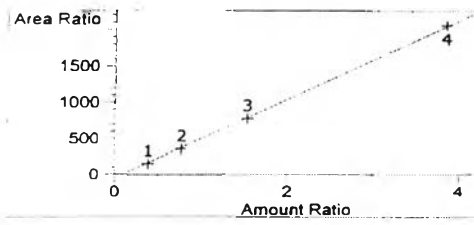
Chloroform at exp. RT: 1.350
ECD1 B,
Correlation: 0.99934
Residual Std. Dev.: 14.10081
Formula: $y = mx + b$
m: 220.06965
b: -9.26774
x: Amount Ratio
y: Area Ratio



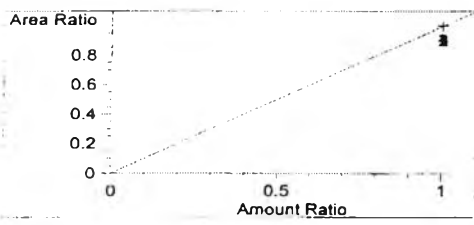
Bromodichloromethane at exp. RT: 1.737
ECD1 B,
Correlation: 0.99952
Residual Std. Dev.: 89.58519
Formula: $y = mx + b$
m: 1643.98936
b: -58.93068
x: Amount Ratio
y: Area Ratio



Dibromochloromethane at exp. RT: 2.509
 ECD1 B,
 Correlation: 0.99960
 Residual Std. Dev.: 74.80137
 Formula: $y = mx + b$
 m: 1495.92782
 b: -91.35492
 x: Amount Ratio
 y: Area Ratio



Bromoform at exp. RT: 3.654
 ECD1 B,
 Correlation: 0.99941
 Residual Std. Dev.: 32.93052
 Formula: $y = mx + b$
 m: 544.96540
 b: -44.29958
 x: Amount Ratio
 y: Area Ratio



Bromofluorobenzene at exp. RT: 4.323
 ECD1 B,
 Correlation: 1.00000
 Residual Std. Dev.: 0.00000
 Formula: $y = mx + b$
 m: 1.00000
 b: 0.00000
 x: Amount Ratio
 y: Area Ratio

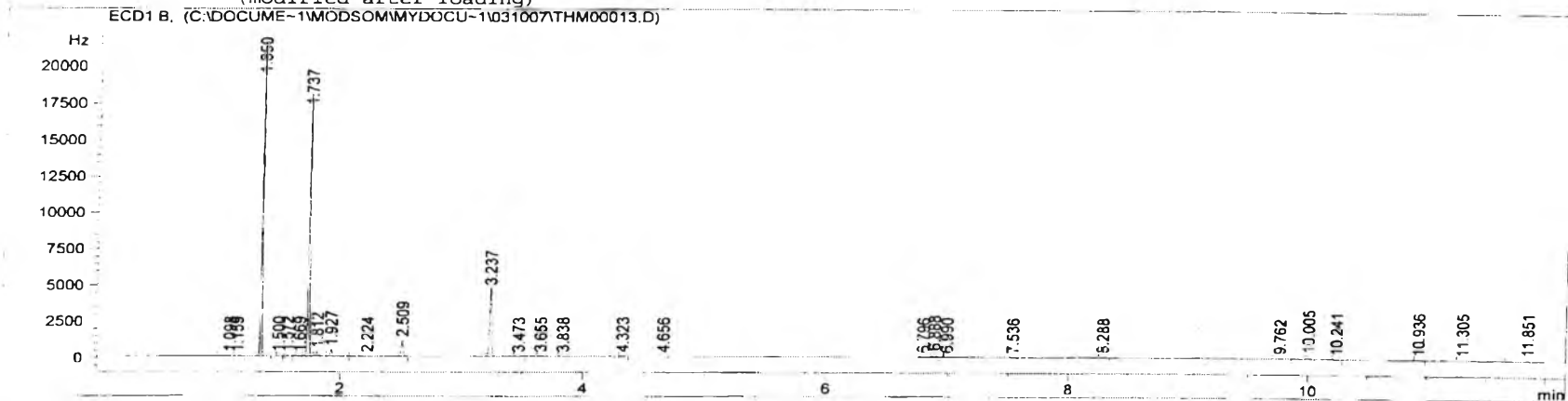
Figure C-2 GC peaks

Milli Q

```

=====
Injection Date : 10/7/2003 3:57:12 PM      Seq. Line : 13
Sample Name    : fil No 4 (0.8)           Location  : Vial 13
Acq. Operator  : aweewan                  Inj       : 1
                                           Inj Volume: 1 µl

Acq. Method    : C:\HPCHEM\1\METHODS\SOM.M
Last changed   : 10/7/2003 10:01:38 AM by aweewan
Analysis Method : C:\HPCHEM\1\METHODS\S031007.M
Last changed   : 10/7/2003 6:20:07 PM
                (modified after loading)
=====
    
```



Internal Standard Report

```

=====
Sorted By      : Signal
Calib. Data Modified : Tuesday, October 07, 2003 6:13:24 PM
Multiplier     : 1.0000
Dilution       : 1.0000
    
```

Sample ISTD Information:

ISTD #	ISTD Amount [ng/ul]	Name
1	130.0000	Bromofluorobenzene

Signal 1: ECD1 B,

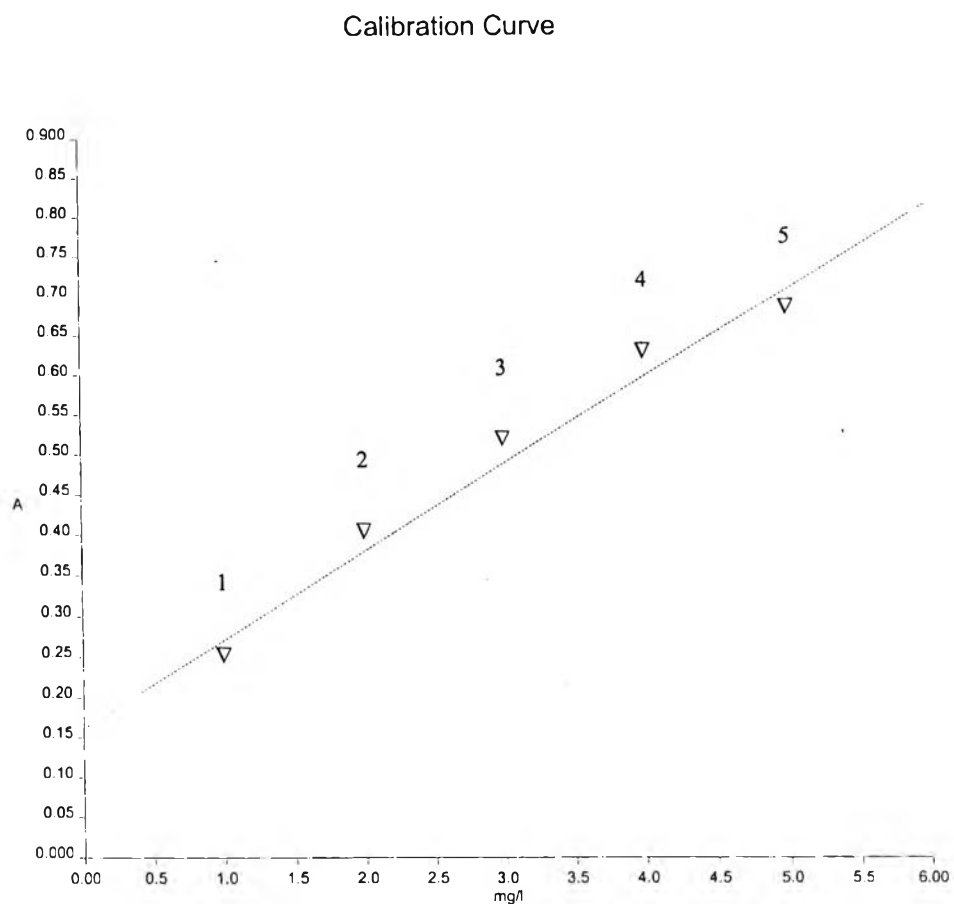
RetTime [min]	Type	Area [Hz*s]	Amt/Area ratio	Amount [ng/ul]	Grp	Name
1.350	PB S	1.44610e4	4.59583e-3	485.62961		Chloroform
1.737	VB S	1.52193e4	6.50180e-4	72.30551		Bromodichloromethane
2.509	BP	1269.52051	1.52430e-3	14.14011		Dibromochloromethane
3.655	BB	19.87451	7.46022e-2	10.83403		Bromoform
4.323	PB +I	17.79104	1.00000	130.00000		Bromofluorobenzene

Totals without ISTD(s) : 582.90926

Results obtained with enhanced integrator!

=====
*** End of Report ***

Figure C-3 Calibration curve of chlorine residual



Spectrum Name: cl0308

Description: $y = 1.616890e-01 + 1.090690e-01 \cdot x$

Comments: RE = 3.132491e-02, CC = 9.878522e-01

Date Created: Sun Aug 03 13:53:35 2003



Figure C-4 Data of free chlorine residual concentration

THERMO SPECTRONIC ~ VISION32 SOFTWARE V1.25

Operator Name (None Entered)
 Department (None Entered)
 Organisation (None Entered)
 Information (None Entered)

Date of Report 27/10/2003
 Time of Report 12:23:33

Quant Results Table - quant001

	Sample	515.0nm	Conc.	Errors
1	Sample001	0.419	2.822	None
2	Sample002	0.314	1.939	None
3	Sample003	-0.033	-0.954	I
4	Sample004	-0.033	-0.954	I
5	Sample005	-0.033	-0.954	I
6	Sample006	0.306	1.872	None
7	Sample007	0.510	3.579	None
8	Sample008	0.735	5.456	A
9	Sample009	0.770	5.747	A
10	Sample010	0.372	2.423	None
11	Sample011	0.511	3.583	None
12	Sample012	0.625	4.538	A
13	Sample013	0.267	1.548	None
14	Sample014	-0.033	-0.953	I
15	Sample015	-0.033	-0.952	I
16	Sample016	0.263	1.518	None
17	Sample017	0.758	5.646	A
18	Sample018	0.277	1.634	None
19	Sample019	0.031	-0.418	I
20	Sample020	0.789	5.911	A
21	Sample021	0.137	0.460	None
22	Sample022	0.251	1.412	None
23	Sample023	0.490	3.415	None
24	Sample024	0.553	3.935	None
25	Sample025	0.284	1.689	None
26	Sample026	0.102	0.175	None
27	Sample027	0.219	1.146	None
28	Sample028	0.477	3.303	None
29	Sample029	0.536	3.792	None
30	Sample030	0.269	1.565	None
31	Sample031	0.471	3.251	None

Figure C-5 Data of UV-254

THERMO SPECTRONIC - VISION32 SOFTWARE V1.25

Operator Name (None Entered)
 Department (None Entered)
 Organisation (None Entered)
 Information (None Entered)

Date of Report 30/09/2003
 Time of Report 5:33:55

Results Table - result-uv254-day7-farm1-4.fre

Data Mode	Absorbance
Sample	254.0nm
1	fil NO.1-Chlorin 0.104
2	fil NO.3-Chlorin 0.095
3	raw NO.1-Chlor 0.113
4	raw NO.3-Chlor 0.101
5	raw NO.2-Chlor 0.149
6	fil NO.2-Chlorin 0.108
7	fil NO.1-Chlorin 0.105
8	raw NO.1-Chlor 0.121
9	fil NO.2-Chlorin 0.099
10	raw NO.3-Chlor 0.114
11	fil NO.2-Chlorin 0.099
12	raw NO.3-Chlor 0.107
13	fil NO.4-Chlorin 0.054
14	raw NO.4-Chlor 0.108

All calculations have been performed to double precision as defined by ANSI/IEEE STD 754-1985 but have been rounded for display purposes.

Date Collected 30/09/2003 Time Collected 5:21:36
 Instrument ID 112726 Operator Name (None Entered)

Fixed Method - uv254-day7-farm1-4.fre

Integ. Time 00:00:01 hh:mm:ss Lamp Change 325.0 nm
 Bandwidth 2.0 nm

Cell Prog Method - (Untitled)

1	2	3	4	5	6	7	8
R	S	S	S	S	S	S	Off

BIOGRAPHY

Name Aweewan Mangmeechai
Date of Birth DEC 18, 1980
Place of Birth Bangkok, Thailand
Institution Attended Benjamaracharai School, Bangkok, Thailand

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Faculty of Environmental and Resource Study
Major of Environmental Science and Technology ,
Mahidol University

Bachelor of Sciences

