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Appendices

Appendix A

Algal media

J/1 medium (Borowitzka, 1988)		JR medium	
Chemicals	Concentration (g/L)	Chemicals	Concentration (g/L)
NaCl	30	NaCl	30
KCl	0.2	16-16-16 Fertilizer	2.19
KNO ₃	1		
K ₂ HPO ₄	0.035		
MgSO ₄ ·7H ₂ O	0.5	MgSO ₄ ·7H ₂ O	0.5
CaCl ₂ ·2H ₂ O	0.2	CaCl ₂ ·2H ₂ O	0.2
NaHCO ₃	0.043	Unilate	0.86
H ₃ BO ₃	0.0061		
NH ₄₍₆₎ Mo ₇ O ₂₇ ·4	0.0038		
H ₂ O	0.00244		
FeCl ₃ ·6 H ₂ O	0.00006		
CuSO ₄ ·5 H ₂ O	0.000051		
CoCl ₂ ·6 H ₂ O	0.000041		
ZnCl ₂	0.000041		
MnCl ₂ ·4 H ₂ O			

Appendix B
Statistical Analysis

Growth rate of *D.salina* in various concentrations of JR media

ANOVA

CELL1

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.9E+11	4	1.234E+11	175.497	.000
Within Groups	7.0E+09	10	703202000		
Total	5.0E+11	14			

Multiple Comparisons

Dependent Variable: CELL1

	(I) JR	(J) JR	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	.25	.50	-39333.3333	21651.82	.416	-110592.4289	31925.7622
		1.00	-68666.6667	21651.82	.060	-139925.7622	2592.4289
		2.50	-84666.6667*	21651.82	.019	-155925.7622	-13407.5711
		5.00	399600.0000*	21651.82	.000	328340.9044	470859.0956
	.50	.25	39333.3333	21651.82	.416	-31925.7622	110592.4289
		1.00	-29333.3333	21651.82	.667	-100592.4289	41925.7622
		2.50	-45333.3333	21651.82	.294	-116592.4289	25925.7622
		5.00	438933.3333*	21651.82	.000	367674.2378	510192.4289
	1.00	.25	68666.6667	21651.82	.060	-2592.4289	139925.7622
		.50	29333.3333	21651.82	.667	-41925.7622	100592.4289
		2.50	-16000.0000	21651.82	.942	-87259.0956	55259.0956
		5.00	468266.6667*	21651.82	.000	397007.5711	539525.7622
	2.50	.25	84666.6667*	21651.82	.019	13407.5711	155925.7622
		.50	45333.3333	21651.82	.294	-25925.7622	116592.4289
		1.00	16000.0000	21651.82	.942	-55259.0956	87259.0956
		5.00	484266.6667*	21651.82	.000	413007.5711	555525.7622
	5.00	.25	-399600.00*	21651.82	.000	-470859.0956	-328340.904
		.50	-438933.33*	21651.82	.000	-510192.4289	-367674.238
		1.00	-468266.67*	21651.82	.000	-539525.7622	-397007.571
		2.50	-484266.67*	21651.82	.000	-555525.7622	-413007.571

*. The mean difference is significant at the .05 level.

Growth rate of *D. salina* in various pH

ANOVA

CELL

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.8E+11	6	1.307E+11	2995.322	.000
Within Groups	6.1E+08	14	43619047.6		
Total	7.8E+11	20			

Multiple Comparisons

Dependent Variable: CELL

	(I) PH	(J) PH	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	6.0	6.5	-130666.67*	5392.529	.000	-149080.1780	-112253.155
		7.0	-148000.00*	5392.529	.000	-166413.5113	-129586.489
		7.5	-244666.67*	5392.529	.000	-263080.1780	-226253.155
		8.0	-450000.00*	5392.529	.000	-468413.5113	-431586.489
		8.5	-508000.00*	5392.529	.000	-526413.5113	-489586.489
		9.0	34000.0000*	5392.529	.000	15586.4887	52413.5113
	6.5	6.0	130666.6667*	5392.529	.000	112253.1553	149080.1780
		7.0	-17333.3333	5392.529	.071	-35746.8447	1080.1780
		7.5	-114000.00*	5392.529	.000	-132413.5113	-95586.4887
		8.0	-319333.33*	5392.529	.000	-337746.8447	-300919.822
		8.5	-377333.33*	5392.529	.000	-395746.8447	-358919.822
		9.0	164666.6667*	5392.529	.000	146253.1553	183080.1780
	7.0	6.0	148000.0000*	5392.529	.000	129586.4887	166413.5113
		6.5	17333.3333	5392.529	.071	-1080.1780	35746.8447
		7.5	-96666.6667*	5392.529	.000	-115080.1780	-78253.1553
		8.0	-302000.00*	5392.529	.000	-320413.5113	-283586.489
		8.5	-360000.00*	5392.529	.000	-378413.5113	-341586.489
		9.0	182000.0000*	5392.529	.000	163586.4887	200413.5113
	7.5	6.0	244666.6667*	5392.529	.000	226253.1553	263080.1780
		6.5	114000.0000*	5392.529	.000	95586.4887	132413.5113
7.0		96666.6667*	5392.529	.000	78253.1553	115080.1780	
8.0		-205333.33*	5392.529	.000	-223746.8447	-186919.822	
8.5		-263333.33*	5392.529	.000	-281746.8447	-244919.822	
	9.0	278666.6667*	5392.529	.000	260253.1553	297080.1780	
8.0	6.0	450000.0000*	5392.529	.000	431586.4887	468413.5113	
	6.5	319333.3333*	5392.529	.000	300919.8220	337746.8447	
	7.0	302000.0000*	5392.529	.000	283586.4887	320413.5113	
	7.5	205333.3333*	5392.529	.000	186919.8220	223746.8447	
	8.5	-58000.0000*	5392.529	.000	-76413.5113	-39586.4887	
	9.0	484000.0000*	5392.529	.000	465586.4887	502413.5113	
8.5	6.0	508000.0000*	5392.529	.000	489586.4887	526413.5113	
	6.5	377333.3333*	5392.529	.000	358919.8220	395746.8447	
	7.0	360000.0000*	5392.529	.000	341586.4887	378413.5113	
	7.5	263333.3333*	5392.529	.000	244919.8220	281746.8447	
	8.0	58000.0000*	5392.529	.000	39586.4887	76413.5113	
	9.0	542000.0000*	5392.529	.000	523586.4887	560413.5113	
9.0	6.0	-34000.0000*	5392.529	.000	-52413.5113	-15586.4887	
	6.5	-164666.67*	5392.529	.000	-183080.1780	-146253.155	
	7.0	-182000.00*	5392.529	.000	-200413.5113	-163586.489	
	7.5	-278666.67*	5392.529	.000	-297080.1780	-260253.155	
	8.0	-484000.00*	5392.529	.000	-502413.5113	-465586.489	
	8.5	-542000.00*	5392.529	.000	-560413.5113	-523586.489	

*. The mean difference is significant at the .05 level.

Growth rate of *D. salina* in 1X JR and 1X J/1 media

ANOVA

CELL2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.7E+08	1	367916043	.102	.752
Within Groups	7.9E+10	22	3599152021		
Total	8.0E+10	23			

Bialaphos screening of *D. salina* ranging from 5 – 12 ppm

ANOVA

CELL3

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.2E+11	8	1.493E+10	393.710	.000
Within Groups	6.8E+08	18	37925929.6		
Total	1.2E+11	26			

Multiple Comparisons

Dependent Variable: CELL3

	(I) BIA	(J) BIA	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	.00	5.00	108000.0000*	5028.315	.000	90381.3610	125618.6390
		6.00	153333.3333*	5028.315	.000	135714.6943	170951.9724
		7.00	180000.0000*	5028.315	.000	162381.3610	197618.6390
		8.00	195000.0000*	5028.315	.000	177381.3610	212618.6390
		9.00	209906.6667*	5028.315	.000	192288.0276	227525.3057
		10.00	210000.0000*	5028.315	.000	192381.3610	227618.6390
		11.00	210000.0000*	5028.315	.000	192381.3610	227618.6390
		12.00	210000.0000*	5028.315	.000	192381.3610	227618.6390
	5.00	.00	-108000.00*	5028.315	.000	-125618.6390	-90381.3610
		6.00	45333.3333*	5028.315	.000	27714.6943	62951.9724
		7.00	72000.0000*	5028.315	.000	54381.3610	89618.6390
		8.00	87000.0000*	5028.315	.000	69381.3610	104618.6390
		9.00	101906.6667*	5028.315	.000	84288.0276	119525.3057
		10.00	102000.0000*	5028.315	.000	84381.3610	119618.6390
		11.00	102000.0000*	5028.315	.000	84381.3610	119618.6390
		12.00	102000.0000*	5028.315	.000	84381.3610	119618.6390
	6.00	.00	-153333.33*	5028.315	.000	-170951.9724	-135714.694
		5.00	-45333.3333*	5028.315	.000	-62951.9724	-27714.6943
		7.00	26666.6667*	5028.315	.001	9048.0276	44285.3057
		8.00	41666.6667*	5028.315	.000	24048.0276	59285.3057
		9.00	56573.3333*	5028.315	.000	38954.6943	74191.9724
		10.00	56666.6667*	5028.315	.000	39048.0276	74285.3057
		11.00	56666.6667*	5028.315	.000	39048.0276	74285.3057
		12.00	56666.6667*	5028.315	.000	39048.0276	74285.3057

7.00	.00	-180000.00*	5028.315	.000	-197618.6390	-162381.361
	5.00	-72000.0000*	5028.315	.000	-89618.6390	-54381.3610
	6.00	-26666.6667*	5028.315	.001	-44285.3057	-9048.0276
	8.00	15000.0000	5028.315	.133	-2618.6390	32618.6390
	9.00	29906.6667*	5028.315	.000	12288.0276	47525.3057
	10.00	30000.0000*	5028.315	.000	12381.3610	47618.6390
	11.00	30000.0000*	5028.315	.000	12381.3610	47618.6390
	12.00	30000.0000*	5028.315	.000	12301.3610	47610.6390
8.00	.00	-195000.00*	5028.315	.000	-212618.6390	-177381.361
	5.00	-87000.0000*	5028.315	.000	-104618.6390	-69381.3610
	6.00	-41666.6667*	5028.315	.000	-59285.3057	-24048.0276
	7.00	-15000.0000	5028.315	.133	-32618.6390	2618.6390
	9.00	14906.6667	5028.315	.137	-2711.9724	32525.3057
	10.00	15000.0000	5028.315	.133	-2618.6390	32618.6390
	11.00	15000.0000	5028.315	.133	-2618.6390	32618.6390
	12.00	15000.0000	5028.315	.133	-2618.6390	32618.6390
9.00	.00	-209906.67*	5028.315	.000	-227525.3057	-192288.028
	5.00	-101906.67*	5028.315	.000	-119525.3057	-84288.0276
	6.00	-56573.3333*	5028.315	.000	-74191.9724	-38954.6943
	7.00	-29906.6667*	5028.315	.000	-47525.3057	-12288.0276
	8.00	-14906.6667	5028.315	.137	-32525.3057	2711.9724
	10.00	93.3333	5028.315	1.000	-17525.3057	17711.9724
	11.00	93.3333	5028.315	1.000	-17525.3057	17711.9724
	12.00	93.3333	5028.315	1.000	-17525.3057	17711.9724
10.00	.00	-210000.00*	5028.315	.000	-227618.6390	-192381.361
	5.00	-102000.00*	5028.315	.000	-119618.6390	-84381.3610
	6.00	-56666.6667*	5028.315	.000	-74285.3057	-39048.0276
	7.00	-30000.0000*	5028.315	.000	-47618.6390	-12381.3610
	8.00	-15000.0000	5028.315	.133	-32618.6390	2618.6390
	9.00	-93.3333	5028.315	1.000	-17711.9724	17525.3057
	11.00	.0000	5028.315	1.000	-17618.6390	17618.6390
	12.00	.0000	5028.315	1.000	-17618.6390	17618.6390
11.00	.00	-210000.00*	5028.315	.000	-227618.6390	-192381.361
	5.00	-102000.00*	5028.315	.000	-119618.6390	-84381.3610
	6.00	-56666.6667*	5028.315	.000	-74285.3057	-39048.0276
	7.00	-30000.0000*	5028.315	.000	-47618.6390	-12381.3610
	8.00	-15000.0000	5028.315	.133	-32618.6390	2618.6390
	9.00	-93.3333	5028.315	1.000	-17711.9724	17525.3057
	10.00	.0000	5028.315	1.000	-17618.6390	17618.6390
	12.00	.0000	5028.315	1.000	-17618.6390	17618.6390
12.00	.00	-210000.00*	5028.315	.000	-227618.6390	-192381.361
	5.00	-102000.00*	5028.315	.000	-119618.6390	-84381.3610
	6.00	-56666.6667*	5028.315	.000	-74285.3057	-39048.0276
	7.00	-30000.0000*	5028.315	.000	-47618.6390	-12381.3610
	8.00	-15000.0000	5028.315	.133	-32618.6390	2618.6390
	9.00	-93.3333	5028.315	1.000	-17711.9724	17525.3057
	10.00	.0000	5028.315	1.000	-17618.6390	17618.6390
	11.00	.0000	5028.315	1.000	-17618.6390	17618.6390

*. The mean difference is significant at the .05 level.

Efficiency of pBicBar transformation in various PEG concentrations

Multiple Comparisons

Dependent Variable: CELL4

	(I) PEG	(J) PEG	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	.00	.02	-24000.0000	12966.07	.531	-66150.2923	18150.2923
		.04	-34500.0000	12966.07	.158	-76650.2923	7650.2923
		.06	-43500.0000*	12966.07	.040	-85650.2923	-1349.7077
		.08	-94000.0000*	12966.07	.000	-136150.2923	-51849.7077
		.10	-63000.0000*	12966.07	.001	-105150.2923	-20849.7077
		.11	-152500.00*	12966.07	.000	-194650.2923	-110349.708
	.02	.00	24000.0000	12966.07	.531	-18150.2923	66150.2923
		.04	-10500.0000	12966.07	.981	-52650.2923	31650.2923
		.06	-19500.0000	12966.07	.740	-61650.2923	22650.2923
		.08	-70000.0000*	12966.07	.000	-112150.2923	-27849.7077
		.10	-39000.0000	12966.07	.082	-81150.2923	3150.2923
		.11	-128500.00*	12966.07	.000	-170650.2923	-86349.7077
	.04	.00	34500.0000	12966.07	.158	-7650.2923	76650.2923
		.02	10500.0000	12966.07	.981	-31650.2923	52650.2923
		.06	-9000.0000	12966.07	.992	-51150.2923	33150.2923
		.08	-59500.0000*	12966.07	.003	-101650.2923	-17349.7077
		.10	-28500.0000	12966.07	.337	-70650.2923	13650.2923
		.11	-118000.00*	12966.07	.000	-160150.2923	-75849.7077
	.06	.00	43500.0000*	12966.07	.040	1349.7077	85650.2923
		.02	19500.0000	12966.07	.740	-22650.2923	61650.2923
		.04	9000.0000	12966.07	.992	-33150.2923	51150.2923
		.08	-50500.0000*	12966.07	.012	-92650.2923	-8349.7077
		.10	-19500.0000	12966.07	.740	-61650.2923	22650.2923
		.11	-109000.00*	12966.07	.000	-151150.2923	-66849.7077
	.08	.00	94000.0000*	12966.07	.000	51849.7077	136150.2923
		.02	70000.0000*	12966.07	.000	27849.7077	112150.2923
		.04	59500.0000*	12966.07	.003	17349.7077	101650.2923
		.06	50500.0000*	12966.07	.012	8349.7077	92650.2923
		.10	31000.0000	12966.07	.251	-11150.2923	73150.2923
		.11	-58500.0000*	12966.07	.003	-100650.2923	-16349.7077
.10	.00	63000.0000*	12966.07	.001	20849.7077	105150.2923	
	.02	39000.0000	12966.07	.082	-3150.2923	81150.2923	
	.04	28500.0000	12966.07	.337	-13650.2923	70650.2923	
	.06	19500.0000	12966.07	.740	-22650.2923	61650.2923	
	.08	-31000.0000	12966.07	.251	-73150.2923	11150.2923	
	.11	-89500.0000*	12966.07	.000	-131650.2923	-47349.7077	
.11	.00	152500.0000*	12966.07	.000	110349.7077	194650.2923	
	.02	128500.0000*	12966.07	.000	86349.7077	170650.2923	
	.04	118000.0000*	12966.07	.000	75849.7077	160150.2923	
	.06	109000.0000*	12966.07	.000	66849.7077	151150.2923	
	.08	58500.0000*	12966.07	.003	16349.7077	100650.2923	
	.10	89500.0000*	12966.07	.000	47349.7077	131650.2923	

*. The mean difference is significant at the .05 level.

Biography

Mr.Poramate Klanrit was born on May 4, 1982 in Udonthani, Thailand. He graduated with the degree of Bachelor's of Science in Biology from the Department of Marine Science, Chulalongkorn University in 2002. He enrolled in Master's degree of Science in Genetic Program at the Department of Botany Chulalongkorn University.