Supporting Information

Recovery of phycobiliproteins from the red macroalga *Gracilaria* sp. using ionic liquid solutions

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Table A1. Design matrix for the surface response design for a 2^3 factorial planning.

Experiment	X_1	X_2	X_3
1	-1	-1	-1
2	1	-1	-1
3	-1	1	-1
4	1	1	-1
5	-1	-1	1
6	1	-1	1
7	-1	1	1
8	1	1	1
9	-1.68	0	0
10	1.68	0	0
11	0	-1.68	0
12	0	1.68	0
13	0	0	-1.68
14	0	0	1.68
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0

Table A2. Data attributed to the independent variables ([salt], pH and SLR) to define the 2^3 factorial planning, and respective results of yield of extraction of phycobiliproteins extracted experimentally, and theoretically found for the mathematical model defined and the respective relative deviation.

Run	[Salt] (M)	pH	SLR	Yield ($mg_{phycobiliproteins} \cdot g_{fresh\ alga}^{-1}$) Experimental values	Yield ($mg_{phycobiliproteins} \cdot g_{fresh\ alga}^{-1}$) Theoretic values	Residues
1	0.3	5.80	0.60	0.294	0.300	-0.005
2	0.7	5.80	0.60	0.306	0.264	0.042
3	0.3	8.20	0.60	0.268	0.214	0.049
4	0.7	8.20	0.60	0.164	0.163	0.001
5	0.3	5.80	0.80	0.353	0.314	0.039
6	0.7	5.80	0.80	0.309	0.318	-0.009
7	0.3	8.20	0.80	0.270	0.272	-0.001
8	0.7	8.20	0.80	0.306	0.261	0.046
9	0.2	7.00	0.70	0.217	0.246	-0.029
10	0.8	7.00	0.70	0.178	0.206	-0.028
11	0.5	5.00	0.70	0.249	0.269	-0.020
12	0.5	9.02	0.70	0.112	0.149	-0.037
13	0.5	7.00	0.53	0.275	0.307	-0.032
14	0.5	7.00	0.87	0.376	0.401	-0.025
15	0.5	7.00	0.70	0.243	0.261	-0.018
16	0.5	7.00	0.70	0.242	0.261	-0.019
17	0.5	7.00	0.70	0.324	0.261	0.062
18	0.5	7.00	0.70	0.226	0.261	-0.036

19	0.5	7.00	0.70	0.265	0.261	0.004
20	0.5	7.00	0.70	0.278	0.261	0.017

Table A3. Regression coefficient of the predicted polynomial model of second-order for the yield of extraction of phycobiliproteins extraction obtained from the RSM design using the McIlvaine buffer as solvent.

	Regression Coefficient	**Standard Deviation**	**t-student (10)**	***p*-value**
Interception	1.769	1.024	1.728	0.115
[Salt]	0.016	0.762	0.021	0.984
[Salt]^2	-0.313	0.288	-1.089	0.302
pH	0.095	0.148	0.641	0.536
pH^2	-0.013	0.008	-1.613	0.138
SLR	-5.203	1.890	-2.753	0.020
SLR^2	3.282	1.151	2.851	0.017
[Salt] x pH	-0.015	0.064	-0.240	0.815
[Salt] x SLR	0.496	0.772	0.643	0.535
pH x SLR	0.091	0.129	0.711	0.493

Table A4. ANOVA data for the yield of extraction of phycobiliproteins obtained in the factorial design of 2^3 planning.

	Sum of Squares	**Degrees of Freedom**	**Mean of Squares**	**F_{calc}**	***p*-value**
Regression	0.055	9	0.006	3.179	0.038
Error	0.019	10	0.002		
Total	0.076	19	**R^2** = 0.7494		

Figures

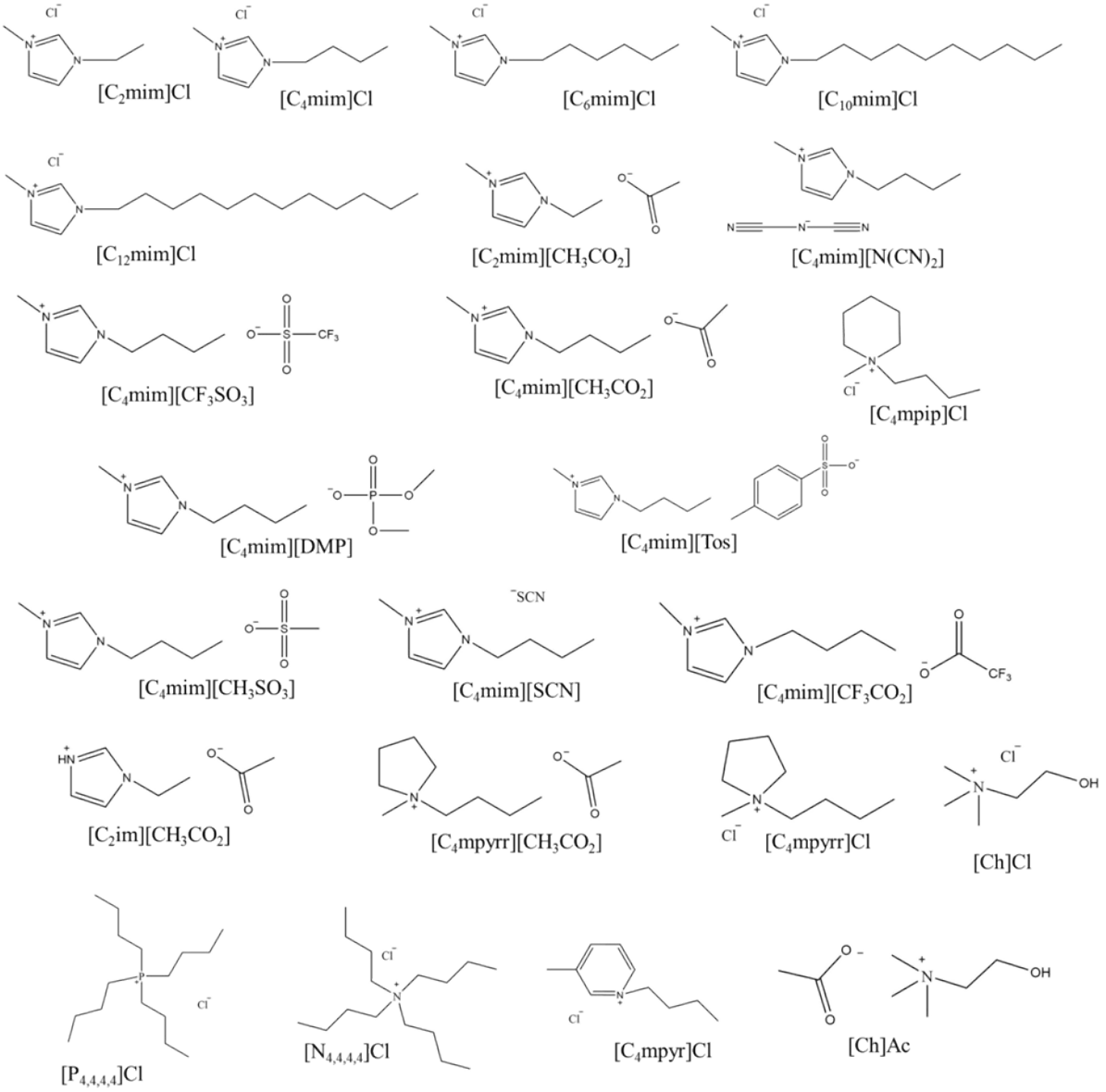

Figure A1. Chemical structure of the ILs used in this work.

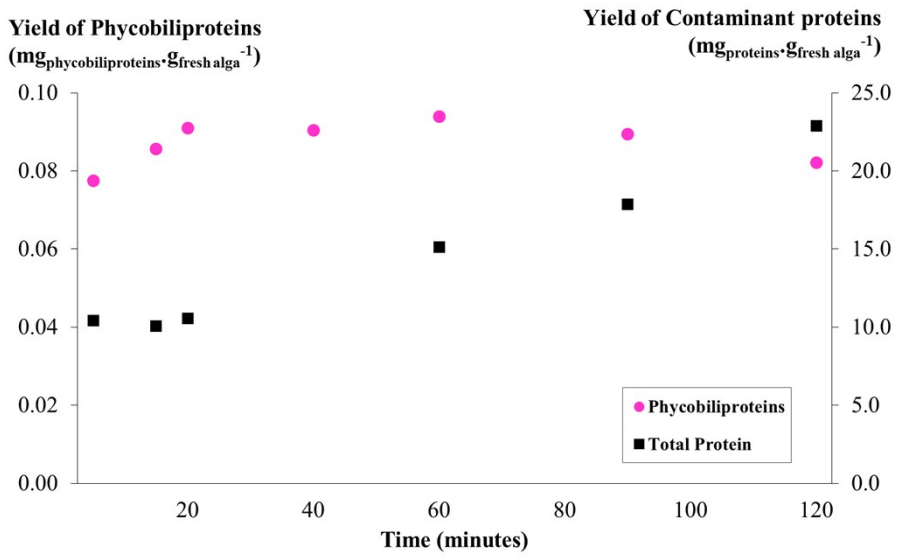

Figure A2. Maximum yield of extraction of phycobiliproteins and contaminant proteins from *Gracilaria sp.* during 2 hours of extraction.

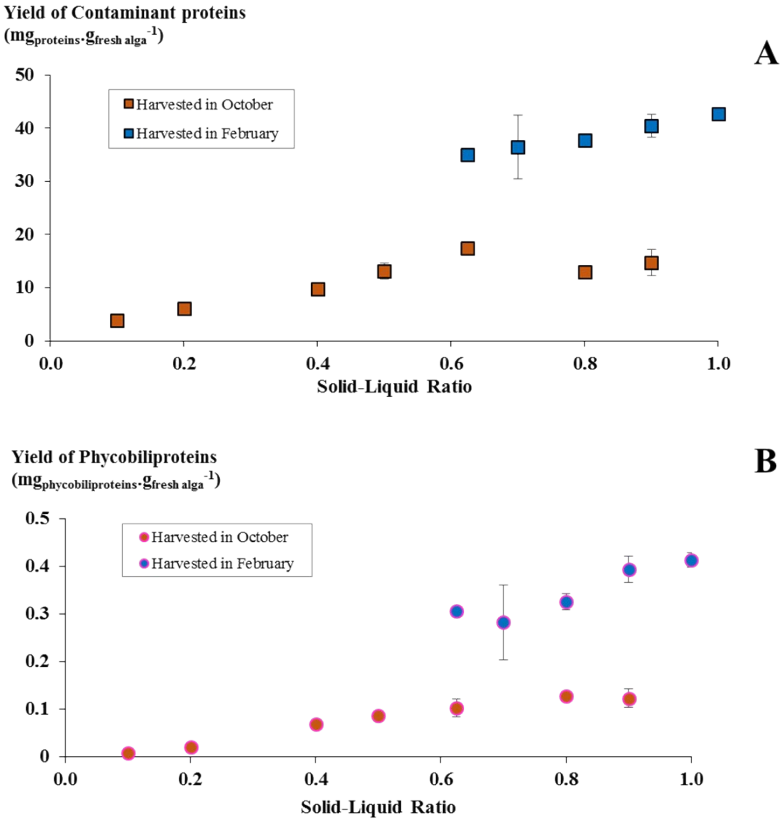

Figure A3. Variation of yield of extraction of (A) contaminants proteins and (B) phycobiliproteins from the macroalgae, regarding the effect of different solid-liquid ratios.

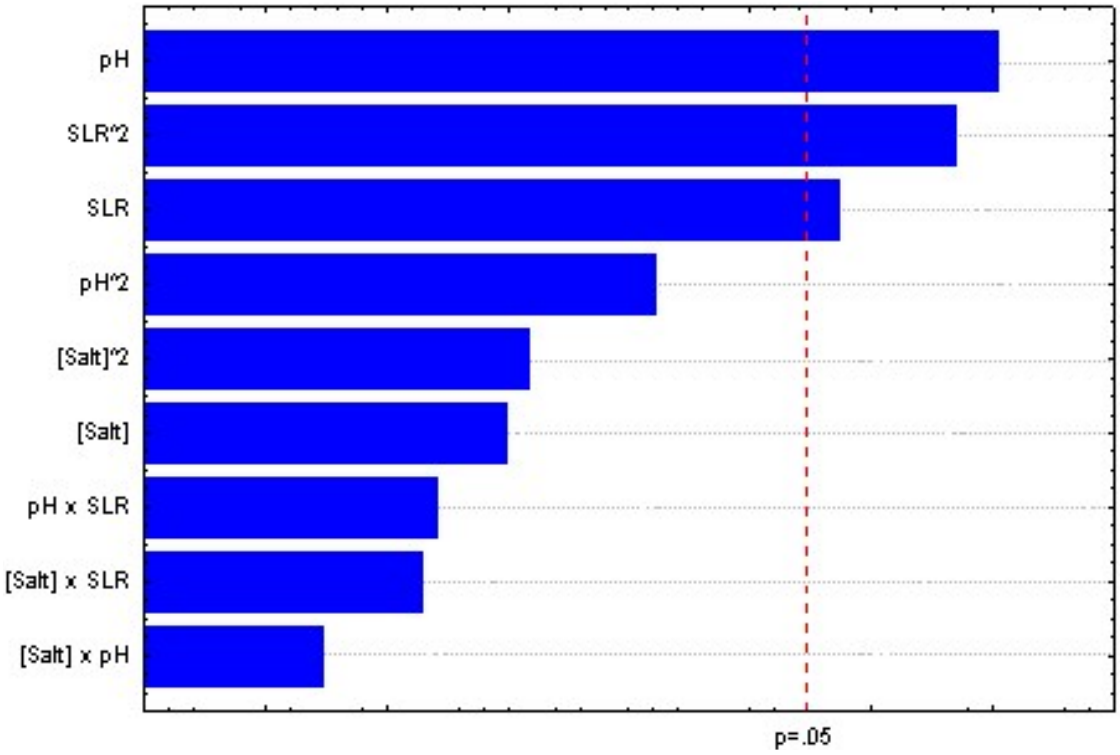

Figure A4. Pareto chart of the standardized effects using a 2^3 factorial design, being variable the yield of extraction of phycobiliproteins ($mg_{phycobiliproteins} \cdot g_{fresh\ alga}^{-1}$).