

Supplementary material

Table S1. Regression coefficients (values of variables are specified in their original units) of phycoerythrin (PE) extraction yield by microwave extraction (MW) from *Porphyridium* spp., statistics for the fit obtained by multiple linear regression.

Terms of the model	Phycoerythrin (PE)			
	<i>P. cruentum</i> Estimated	P-value	<i>P. purpureum</i> Estimated	P-value
constant	13.634		7.9904	
A:Time	0.137	0.5827	-0.0801	0.1252
B:Power	0.056	0.0190*	0.0195	0.1252
C:Solvent	4.971	0.0140*	-2.3122	0.0000*
AA	0.001	0.9049	0.0010	0.7112
AB	-0.001	0.1131	-0.0002	0.4136
AC	-0.141	0.0730	0.0133	0.6428
BB	-6.E-5	0.7084	-4.E-5	0.5545
BC	-0.006	0.6217	-0.0031	0.4754
CC	-3.566	0.0356*	-2.3428	0.0011*
<i>Statistics for the goodness of fit of the model</i>				
R ²	0.610		0.800	
Adjusted R ²	0.404		0.694	
RSD	3.825		1.467	
P	0.270		0.712	

Mathematical models

These regression equations mathematically approach a model to maximize the PE extraction yield from the *Porphyridium* spp. based on the experimental results obtained in this work.

$$PE = 13.63 + 0.06 \cdot P + 4.97 \cdot S + 0.001 \cdot T \cdot P - 0.14 \cdot T \cdot S - 0.00005 \cdot P^2 - 0.005 \cdot P \cdot S - 3.56 \cdot S^2 \quad PE = 8.00 - 2.31 \cdot S + 0.01 \cdot T \cdot S - 0.003 \cdot P \cdot S - 2.34 \cdot S^2$$

Note: R²–determination coefficient, adjusted R², RSD–residual standard deviation, *P-value* of the lack-of-fit test for the model; *- significant coefficients of the model.

Abbreviations: PE: phycoerythrin extraction yield; T: time (s); P: power (W); S: solvent

Table S2. Regression coefficients (values of variables are specified in their original units) of phycoerythrin (PE) extraction yield by ultrasound extraction (US) from *Porphyridium* spp., statistics for the fit obtained by multiple linear regression.

Terms of the model	Phycoerythrin (PE)			
	<i>P. cruentum</i> Estimated	<i>P-value</i>	<i>P. purpureum</i> Estimated	<i>P-value</i>
constant	30.513		3.326	
A: Time	−0.930	0.5028	2.155	0.1050
B: Solvent	6.468	0.3357	−2.195	0.0787
AA	0.053	0.4576	−0.083	0.3480
AB	−0.751	0.0431*	−0.064	0.8255
BB	0.490	0.7754	−5.963	0.0496*
<i>Statistics for the goodness of fit of the model</i>				
R ²	0.8252		0.887	
Adjusted R ²	0.533		0.700	
RSD	2.21		2.641	
P	0.325		0.030	
<i>Mathematical models</i>				
These regression equations mathematically approach a model to maximize the PE extraction yield from the <i>Porphyridium</i> spp. based on the experimental results obtained in this work.				
$PE = 30.51 - 0.93 \cdot T + 6.47 \cdot S + 0.05 \cdot T^2 - 0.75 \cdot T \cdot S + 0.49 \cdot S^2$			$PE = 3.33 + 2.19 \cdot S - 0.06 \cdot T \cdot S - 5.96 \cdot S^2$	

Note: R²–determination coefficient, adjusted R², RSD–residual standard deviation, *P-value* of the lack-of-fit test for the model; * - significant coefficients of the model.

Abbreviations: PE: phycoerythrin extraction yield; T: time (min); S: solvent