

**Table S1:** Correlation matrix of different activities (total antioxidant, scavenging and reducing) and phenolic (TPC) and flavonoid (TFC) contents of the selected red seaweeds.

***Amphiroa anceps***

Correlation matrix (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	<b>0.971</b>	<b>0.949</b>	<b>0.991</b>	<b>0.997</b>
ABTS	<b>0.971</b>	<b>1</b>	<b>0.987</b>	<b>0.994</b>	<b>0.951</b>
DPPH	<b>0.949</b>	<b>0.987</b>	<b>1</b>	<b>0.976</b>	<b>0.924</b>
RP	<b>0.991</b>	<b>0.994</b>	<b>0.976</b>	<b>1</b>	<b>0.979</b>
TFC	<b>0.997</b>	<b>0.951</b>	<b>0.924</b>	<b>0.979</b>	<b>1</b>

Values in bold are different with a significance level  $\alpha=0.05$

p-values (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>0</b>	<b>0.006</b>	<b>0.014</b>	<b>0.001</b>	<b>0.000</b>
ABTS	<b>0.006</b>	<b>0</b>	<b>0.002</b>	<b>0.001</b>	<b>0.013</b>
DPPH	<b>0.014</b>	<b>0.002</b>	<b>0</b>	<b>0.004</b>	<b>0.025</b>
RP	<b>0.001</b>	<b>0.001</b>	<b>0.004</b>	<b>0</b>	<b>0.004</b>
TFC	<b>0.000</b>	<b>0.013</b>	<b>0.025</b>	<b>0.004</b>	<b>0</b>

Coefficients of determination (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	0.942	0.900	0.982	0.994
ABTS	0.942	<b>1</b>	0.974	0.988	0.904
DPPH	0.900	0.974	<b>1</b>	0.953	0.854
RP	0.982	0.988	0.953	<b>1</b>	0.959
TFC	0.994	0.904	0.854	0.959	<b>1</b>

***Gracilaria corticata***

Correlation matrix (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	<b>0.981</b>	<b>0.988</b>	<b>0.998</b>	<b>0.991</b>
ABTS	<b>0.981</b>	<b>1</b>	<b>0.998</b>	<b>0.991</b>	<b>0.975</b>
DPPH	<b>0.988</b>	<b>0.998</b>	<b>1</b>	<b>0.995</b>	<b>0.977</b>
RP	<b>0.998</b>	<b>0.991</b>	<b>0.995</b>	<b>1</b>	<b>0.991</b>
TFC	<b>0.991</b>	<b>0.975</b>	<b>0.977</b>	<b>0.991</b>	<b>1</b>

Values in bold are different with a significance level  $\alpha=0.05$

p-values (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>0</b>	<b>0.003</b>	<b>0.002</b>	<b>0.000</b>	<b>0.001</b>
ABTS	<b>0.003</b>	<b>0</b>	<b>0.000</b>	<b>0.001</b>	<b>0.005</b>
DPPH	<b>0.002</b>	<b>0.000</b>	<b>0</b>	<b>0.000</b>	<b>0.004</b>
RP	<b>0.000</b>	<b>0.001</b>	<b>0.000</b>	<b>0</b>	<b>0.001</b>
TFC	<b>0.001</b>	<b>0.005</b>	<b>0.004</b>	<b>0.001</b>	<b>0</b>

Coefficients of determination (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	0.962	0.977	0.996	0.981
ABTS	0.962	<b>1</b>	0.996	0.982	0.950
DPPH	0.977	0.996	<b>1</b>	0.989	0.954
RP	0.996	0.982	0.989	<b>1</b>	0.981
TFC	0.981	0.950	0.954	0.981	<b>1</b>

**Grateloupia indica**

Correlation matrix (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	<b>0.995</b>	<b>0.988</b>	<b>0.990</b>	<b>0.980</b>
ABTS	<b>0.995</b>	<b>1</b>	<b>0.995</b>	<b>0.999</b>	<b>0.992</b>
DPPH	<b>0.988</b>	<b>0.995</b>	<b>1</b>	<b>0.991</b>	<b>0.976</b>
RP	<b>0.990</b>	<b>0.999</b>	<b>0.991</b>	<b>1</b>	<b>0.996</b>
TFC	<b>0.980</b>	<b>0.992</b>	<b>0.976</b>	<b>0.996</b>	<b>1</b>

Values in bold are different with a significance level  $\alpha=0.05$ 

p-values (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>0</b>	<b>0.000</b>	<b>0.002</b>	<b>0.001</b>	<b>0.003</b>
ABTS	<b>0.000</b>	<b>0</b>	<b>0.000</b>	<b>&lt; 0.0001</b>	<b>0.001</b>
DPPH	<b>0.002</b>	<b>0.000</b>	<b>0</b>	<b>0.001</b>	<b>0.004</b>
RP	<b>0.001</b>	<b>&lt; 0.0001</b>	<b>0.001</b>	<b>0</b>	<b>0.000</b>
TFC	<b>0.003</b>	<b>0.001</b>	<b>0.004</b>	<b>0.000</b>	<b>0</b>

Coefficients of determination (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	0.989	0.976	0.980	0.961
ABTS	0.989	<b>1</b>	0.990	0.997	0.983
DPPH	0.976	0.990	<b>1</b>	0.982	0.953
RP	0.980	0.997	0.982	<b>1</b>	0.993
TFC	0.961	0.983	0.953	0.993	<b>1</b>

**Halymenia porphyriiformis**

Correlation matrix (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	<b>0.985</b>	<b>0.987</b>	<b>0.961</b>	<b>0.987</b>
ABTS	<b>0.985</b>	<b>1</b>	<b>0.995</b>	<b>0.994</b>	<b>0.985</b>
DPPH	<b>0.987</b>	<b>0.995</b>	<b>1</b>	<b>0.986</b>	<b>0.975</b>
RP	<b>0.961</b>	<b>0.994</b>	<b>0.986</b>	<b>1</b>	<b>0.969</b>
TFC	<b>0.987</b>	<b>0.985</b>	<b>0.975</b>	<b>0.969</b>	<b>1</b>

Values in bold are different with a significance level  $\alpha=0.05$ 

p-values (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>0</b>	<b>0.002</b>	<b>0.002</b>	<b>0.009</b>	<b>0.002</b>
ABTS	<b>0.002</b>	<b>0</b>	<b>0.000</b>	<b>0.001</b>	<b>0.002</b>
DPPH	<b>0.002</b>	<b>0.000</b>	<b>0</b>	<b>0.002</b>	<b>0.005</b>
RP	<b>0.009</b>	<b>0.001</b>	<b>0.002</b>	<b>0</b>	<b>0.007</b>
TFC	<b>0.002</b>	<b>0.002</b>	<b>0.005</b>	<b>0.007</b>	<b>0</b>

Coefficients of determination (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	0.970	0.975	0.923	0.975
ABTS	0.970	<b>1</b>	0.990	0.988	0.971
DPPH	0.975	0.990	<b>1</b>	0.973	0.950
RP	0.923	0.988	0.973	<b>1</b>	0.939
TFC	0.975	0.971	0.950	0.939	<b>1</b>

***Kappaphycus alvarezii***

Correlation matrix (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	<b>0.986</b>	<b>0.993</b>	0.391	0.773
ABTS	<b>0.986</b>	<b>1</b>	<b>0.991</b>	0.369	0.693
DPPH	<b>0.993</b>	<b>0.991</b>	<b>1</b>	0.446	0.739
RP	0.391	0.369	0.446	<b>1</b>	0.617
TFC	0.773	0.693	0.739	0.617	<b>1</b>

Values in bold are different with a significance level  $\alpha=0.05$ 

p-values (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>0</b>	<b>0.002</b>	<b>0.001</b>	0.515	0.125
ABTS	<b>0.002</b>	<b>0</b>	<b>0.001</b>	0.541	0.194
DPPH	<b>0.001</b>	<b>0.001</b>	<b>0</b>	0.451	0.153
RP	0.515	0.541	0.451	<b>0</b>	0.267
TFC	0.125	0.194	0.153	0.267	<b>0</b>

Coefficients of determination (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	0.971	0.987	0.153	0.598
ABTS	0.971	<b>1</b>	0.982	0.136	0.481
DPPH	0.987	0.982	<b>1</b>	0.199	0.547
RP	0.153	0.136	0.199	<b>1</b>	0.381
TFC	0.598	0.481	0.547	0.381	<b>1</b>

***Sarconema scinaoides***

Correlation matrix (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	<b>0.949</b>	<b>0.996</b>	<b>0.983</b>	0.757
ABTS	<b>0.949</b>	<b>1</b>	<b>0.971</b>	<b>0.990</b>	0.588
DPPH	<b>0.996</b>	<b>0.971</b>	<b>1</b>	<b>0.995</b>	0.713
RP	<b>0.983</b>	<b>0.990</b>	<b>0.995</b>	<b>1</b>	0.671
TFC	0.757	0.588	0.713	0.671	<b>1</b>

Values in bold are different with a significance level  $\alpha=0.05$ 

p-values (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>0</b>	<b>0.014</b>	<b>0.000</b>	<b>0.003</b>	0.138
ABTS	<b>0.014</b>	<b>0</b>	<b>0.006</b>	<b>0.001</b>	0.297
DPPH	<b>0.000</b>	<b>0.006</b>	<b>0</b>	<b>0.000</b>	0.177
RP	<b>0.003</b>	<b>0.001</b>	<b>0.000</b>	<b>0</b>	0.215
TFC	0.138	0.297	0.177	0.215	<b>0</b>

Coefficients of determination (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	0.900	0.991	0.966	0.574
ABTS	0.900	<b>1</b>	0.943	0.981	0.346
DPPH	0.991	0.943	<b>1</b>	0.989	0.508
RP	0.966	0.981	0.989	<b>1</b>	0.450
TFC	0.574	0.346	0.508	0.450	<b>1</b>

### ***Solieria robusta***

Correlation matrix (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	<b>0.985</b>	<b>0.982</b>	<b>0.953</b>	<b>0.953</b>
ABTS	<b>0.985</b>	<b>1</b>	<b>0.997</b>	<b>0.985</b>	<b>0.971</b>
DPPH	<b>0.982</b>	<b>0.997</b>	<b>1</b>	<b>0.983</b>	<b>0.985</b>
RP	<b>0.953</b>	<b>0.985</b>	<b>0.983</b>	<b>1</b>	<b>0.948</b>
TFC	<b>0.953</b>	<b>0.971</b>	<b>0.985</b>	<b>0.948</b>	<b>1</b>

*Values in bold are different with a significance level  $\alpha=0.05$*

p-values (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>0</b>	<b>0.002</b>	<b>0.003</b>	<b>0.012</b>	<b>0.012</b>
ABTS	<b>0.002</b>	<b>0</b>	<b>0.000</b>	<b>0.002</b>	<b>0.006</b>
DPPH	<b>0.003</b>	<b>0.000</b>	<b>0</b>	<b>0.003</b>	<b>0.002</b>
RP	<b>0.012</b>	<b>0.002</b>	<b>0.003</b>	<b>0</b>	<b>0.014</b>
TFC	<b>0.012</b>	<b>0.006</b>	<b>0.002</b>	<b>0.014</b>	<b>0</b>

Coefficients of determination (Pearson):

Variables	TPC	ABTS	DPPH	RP	TFC
TPC	<b>1</b>	0.970	0.964	0.909	0.908
ABTS	0.970	<b>1</b>	0.993	0.970	0.943
DPPH	0.964	0.993	<b>1</b>	0.967	0.970
RP	0.909	0.970	0.967	<b>1</b>	0.899
TFC	0.908	0.943	0.970	0.899	<b>1</b>

**Table S2:** Correlation matrix plots for PCA analysis of different activities (total antioxidant, scavenging, reducing and anti-proliferative) and contents (TPC and TFC) of the selected red seaweeds.

**Correlation matrix (Pearson):**

Variables	Antioxidant	Scavenging	Reducing	TPC	TFC	AP-HeLa	AP-Huh
Antioxidant	<b>1</b>	<b>0.940</b>	<b>0.792</b>	0.628	<b>-0.870</b>	0.538	0.708
Scavenging	<b>0.940</b>	<b>1</b>	<b>0.763</b>	0.630	<b>-0.897</b>	0.379	<b>0.801</b>
Reducing	<b>0.792</b>	<b>0.763</b>	<b>1</b>	0.073	-0.452	0.329	0.704
TPC	0.628	0.630	0.073	<b>1</b>	<b>-0.880</b>	0.315	0.481
TFC	<b>-0.870</b>	<b>-0.897</b>	-0.452	<b>-0.880</b>	<b>1</b>	-0.327	-0.684
AP-HeLa	0.538	0.379	0.329	0.315	-0.327	<b>1</b>	-0.025
AP-Huh	0.708	<b>0.801</b>	0.704	0.481	-0.684	-0.025	<b>1</b>

*Values in bold are different with a significance level  $\alpha=0.05$*

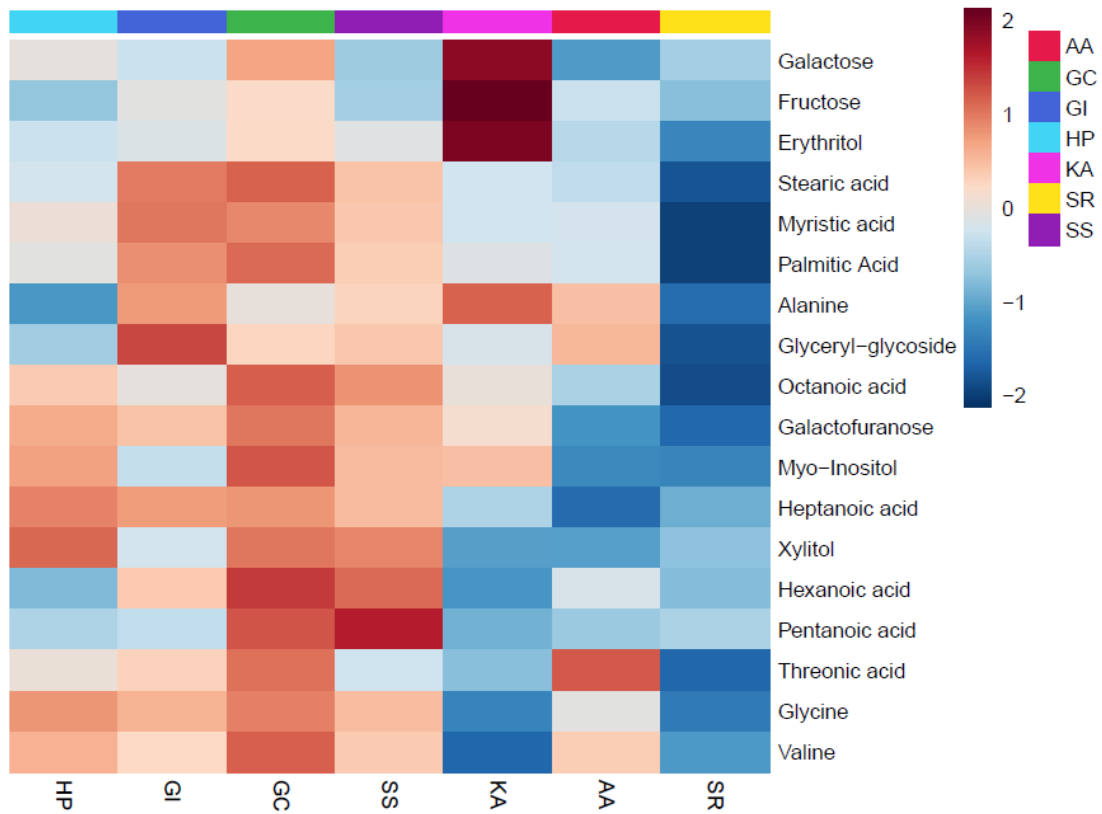
**p-values (Pearson):**

Variables	Antioxidant	Scavenging	Reducing	TPC	TFC	AP-HeLa	AP-Huh
Antioxidant	<b>0</b>	<b>0.002</b>	<b>0.034</b>	0.131	<b>0.011</b>	0.213	0.075
Scavenging	<b>0.002</b>	<b>0</b>	<b>0.046</b>	0.130	<b>0.006</b>	0.402	<b>0.030</b>
Reducing	<b>0.034</b>	<b>0.046</b>	<b>0</b>	0.877	0.308	0.471	0.077
TPC	0.131	0.130	0.877	<b>0</b>	<b>0.009</b>	0.491	0.274
TFC	<b>0.011</b>	<b>0.006</b>	0.308	<b>0.009</b>	<b>0</b>	0.473	0.090
AP-HeLa	0.213	0.402	0.471	0.491	0.473	<b>0</b>	0.958
AP-Huh	0.075	<b>0.030</b>	0.077	0.274	0.090	0.958	<b>0</b>

**Coefficients of determination (Pearson):**

Variables	Antioxidant	Scavenging	Reducing	TPC	TFC	AP-HeLa	AP-Huh
Antioxidant	<b>1</b>	0.883	0.627	0.395	0.757	0.290	0.501
Scavenging	0.883	<b>1</b>	0.582	0.397	0.804	0.144	0.642
Reducing	0.627	0.582	<b>1</b>	0.005	0.205	0.108	0.496
TPC	0.395	0.397	0.005	<b>1</b>	0.774	0.099	0.232
TFC	0.757	0.804	0.205	0.774	<b>1</b>	0.107	0.468
AP-HeLa	0.290	0.144	0.108	0.099	0.107	<b>1</b>	0.001
AP-Huh	0.501	0.642	0.496	0.232	0.468	0.001	<b>1</b>

AP: Anti-proliferative activity on HeLa/ Huh-7 cell lines



**Supplementary Figure S1.** Heatmap inferred from hierarchical cluster analysis and deduced using Spearman's rank correlation coefficients. Heatmap showed differential accumulation of metabolites in different red seaweeds. Seaweed codes used in the study; AA: *Amphiroa anceps*, GC: *Gracilaria corticata*, GI: *Grateloupia indica*, HP: *Halymenia porphyriiformis*, KA: *Kappaphycus alvarezii*, SS: *Sarconema scinaoides*, and SR: *Solieria robusta*