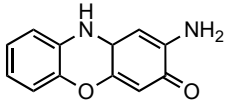
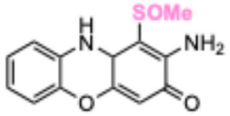
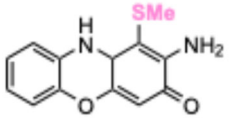
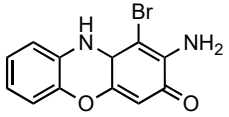
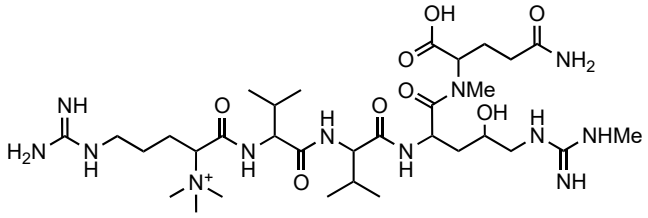
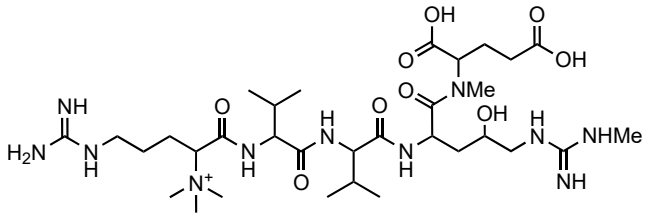
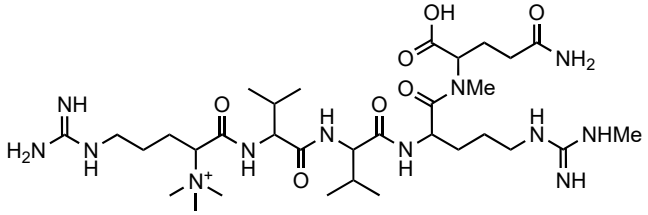
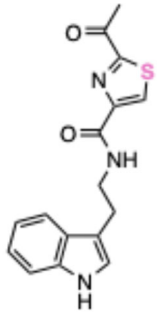
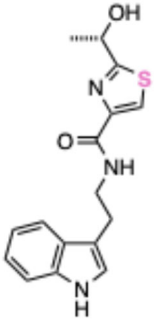
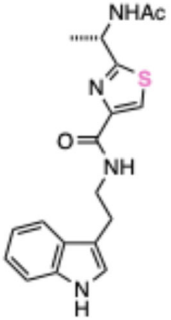
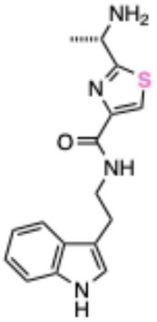
Table 1: Summary of bacteria-derived algaecides involved in symbiotic algae-bacteria interactions.

Compound(s)		Algaecidal/Cyanobacteriocidal Activity					
No.	**Name/Structure**	**Alga/Cyanobacteria**	**MIC (μM)**	**MIC (ppm)**	**$IC_{50}/EC_{50}/LD_{50}$ LC_{50} (μM)**	**$IC_{50}/EC_{50}/LD_{50}$ LC_{50} (μg/mL)**	**Ref.**
5	questiomycin A 	*Bangia fuscopurpurea*	–	–	26	5.6[a]	[1]
		Chattonella antiqua	–	–	0.64	0.14[a]	
		Chaetoceros didymus	–	–	0.59[b]	0.13[ab]	
		Karenia mikimotoi	–	–	1.2[b]	0.26[ab]	
6	questiomycin C 	*Chattonella antiqua*	–	–	0.18	0.05[a]	[1]
7	questiomycin D 	*Chattonella antiqua*	–	–	6.4[c]	1.7[ac]	[1]
8	questiomycin E 	*Chattonella antiqua*	–	–	0.20	0.06[a]	[1]
9	argimicin A 	*Anabaena circinalis*	0.13[d]	0.10[d]	–	–	[2]
		Aphanizomenon flos-aquae	0.10[d]	0.08[d]	–	–	
		Fischerella major	6.7[d]	5.0[d]	–	–	
		Merismopedia tenuissima	0.81[d]	0.60[d]	–	–	
		Microcystis aeruginosa	0.13[d]	0.10[d]	–	–	
		Microcystis virids	0.04[d]	0.03[d]	–	–	
		Oscillatoria agardhii	0.11[d]	0.08[d]	–	–	
		Spirulina platensis	0.81[d]	0.60[d]	–	–	

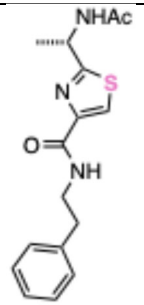
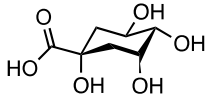
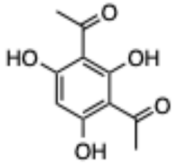
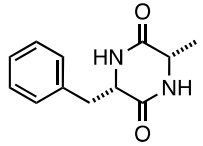
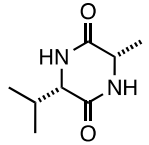
[a] Converted from μM.
[b] Concentration at which more than 90% algal cells lysed.
[c] 95% CI, 100% lethal was not observed within the concentration tested.
[d] Converted from μg/mL.

		Synechocystis sp.	0.01[e]	0.01[e]	–	–	
10	argimicin B 	*Aphanizomenon flos-aquae*	0.13[e]	0.10[e]	–	–	[3]
		Fischerella major	67[e]	50[e]	–	–	
		Merismopedia tenuissima	8.5[e]	6.3[e]	–	–	
		Microcystis aeruginosa	0.07[e]	0.05[e]	–	–	
		Microcystis virids	0.13[e]	0.10[e]	–	–	
		Spirulina platensis	4.2[e]	3.1[e]	–	–	
		Synechocystis sp.	1.0[e]	0.78[e]	–	–	
11	argimicin C 	*Aphanizomenon flos-aquae*	0.07[e]	0.05[e]	–	–	[3]
		Fischerella major	69[e]	50[e]	–	–	
		Merismopedia tenuissima	4.3[e]	3.1[e]	–	–	
		Microcystis aeruginosa	0.26[e]	0.19[e]	–	–	
		Microcystis virids	0.26[e]	0.19[e]	–	–	
		Spirulina platensis	4.3[e]	3.1[e]	–	–	
		Synechocystis sp.	1.1[e]	0.78[e]	–	–	
12	bacillamide A 	*Anabaena circinalis*	–	–	220[e]	69	[4-6]
		Anabaena sp.	–	–	380[e]	120	
		Anabaenopsis circularis	–	–	380[e]	120	
		Ankistrodesmus falcatus	–	–	320[e]	100	
		Aphanizomenon gracile	–	–	190[e]	58	
		Chlorella pyrenoidosa	–	–	800[f]	250[f]	
		Cyclotella sp.	–	–	190[e]	58	
		Cochlodinium polykrikoides	–	–	10[e]	3.2	
		Diacronema sp.	–	–	410[e]	130	
		Gymnodinium catenatum	–	–	350[f]	110[f]	
		Leptolyngbya sp.	–	–	450[e]	140	
		Microcystis aeruginosa	–	–	60[f]–93[e]	19[f]–29	
		Nodularia spumigena	–	–	380[e]	120	
		Phaeodactylum tricornutum	–	–	220[e]	70	
		Skeletonema costatum	–	–	0.03[f]	0.01[f]	
		Scenedesmus obliquus	–	–	140[f]	44[f]	

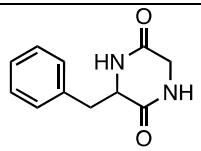
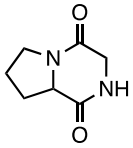
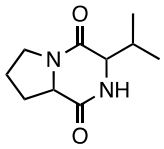
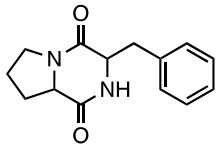
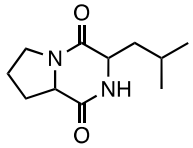
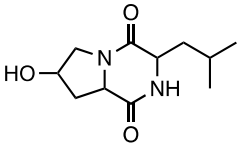
[e] Converted from µg/mL.
[f] Converted from mg/L.

13	bacillamide B 	*Chlorella pyrenoidosa* *Gymnodinium catenatum* *Mycrocyctis aeruginosa* *Scenedesmus obliquus* *Skeletonema costatum*	– – – – –	– – – – –	1200[g] 730[g] 240[g] 698[g] 51[g]	390[g] 230[g] 76[g] 220[g] 16[g]	[4]
14	bacillamide C 	*Chlorella pyrenoidosa* *Gymnodinium catenatum* *Mycrocyctis aeruginosa* *Scenedesmus obliquus* *Skeletonema costatum*	– – – – –	– – – – –	530[g] 160[g] 810[g] 84[g] 98[g]	190[g] 57[g] 290[g] 30[g] 35[g]	[4]
16	bacillamide D 	*Chlorella pyrenoidosa* *Gymnodinium catenatum* *Mycrocyctis aeruginosa* *Scenedesmus obliquus* *Skeletonema costatum*	– – – – –	– – – – –	1200[d] 1.8[d] 350[d] 45[d] 28[d]	380[d] 0.58[d] 110[d] 14[d] 8.7[d]	[4]
15	neobacillamide A	*Chlorella pyrenoidosa* *Mycrocyctis aeruginosa* *Scenedesmus obliquus*	– – –	– – –	180[d] 260[d] 15[d]	58[d] 87[d] 4.7[d]	[4]

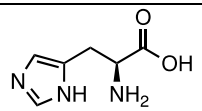
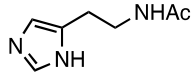
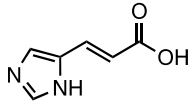
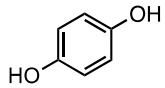
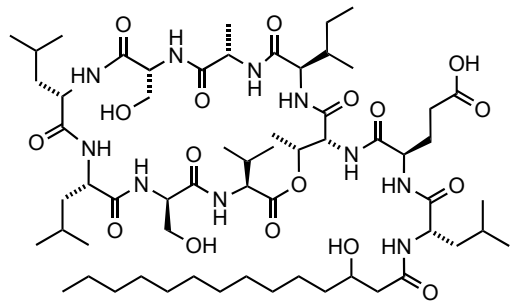
[g] Converted from mg/L.

							
18	quinic acid 	*Phaeocystis globosa*	–	–	110[h]	22[h]	[7]
19	2,4-diacetylphloroglucinol 	*Chlamydomonas reinhardtii*	–	–	350	74[i]	[8]
20	cyclo(L-Ala-L-Phe) 	*Navicula annexa* *Nitzschia closterium* *Ulva pertusa*	– – –	– – –	3.7[j] 220[j] 10[j]	0.80 50 2.2	[9, 10]
21	cyclo(L-Ala-L-Val) 	*Navicula annexa* *Ulva pertusa*	– –	– –	6.5[j] 18[j]	1.1 3.1	[10]
25	cyclo(Gly-Phe)	*Microcystis aeruginosa*	–	–	23[j]	4.7	[11]

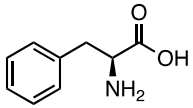
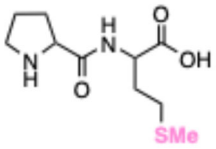
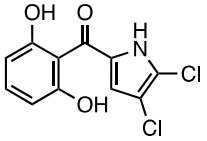
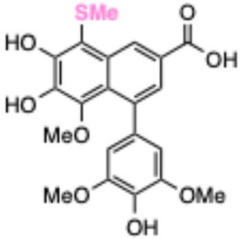
[h] Converted from mg/L.
[i] Converted from µM.
[j] Converted from µg/mL.

							
27	cyclo(Gly-Pro) 	*Akashiwo sanguinea* *Microcystis aeruginosa*	– –	– –	1100[l] 37[k]	170[l] 5.7	12-14
28	cyclo(Pro-Val) 	*Microcystis aeruginosa*	–	–	97[k]	19	13
29	cyclo(Phe-Pro) 	*Microcystis aeruginosa*	–	–	7.8[k]	1.9	15
30	cyclo(Leu-Pro) 	*Microcystis aeruginosa*	–	–	13[k]	2.7	16
31	cyclo(Leu-Pro-4-OH) 	*Microcystis aeruginosa*	–	–	5.7[k]	1.3	16
33	L-histidine	*Phaeocystis globosa*	97[k]	15[k]	150[k]	23	17, 18

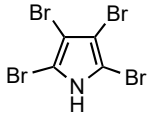
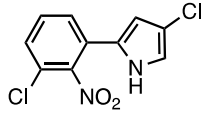
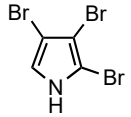
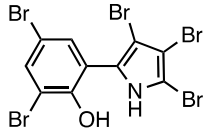
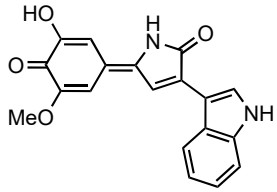
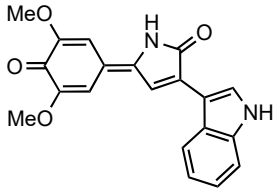
[k] Converted from µg/mL.
[l] Converted from g/L.

							
34	*N*-acetyl histamine 	*Heterosigma akashiwo* *Phaeocystis globosa* *Prorocentrum donghaiense* *Skeletonema costatum*	26[m] 26[m] 26[m] 26[m]	4.0[m] 4.0[m] 4.0[m] 4.0[m]	3.3[m] 100[m] – –	0.50 16 – –	17-19
35	urocanic acid 	*Heterosigma akashiwo* *Phaeocystis globosa* *Prorocentrum donghaiense* *Skeletonema costatum*	15[m] 3.6[m] 15[m] 15[m]	2.0[m] 0.50[m] 2.0[m] 2.0[m]	1600[m] 58[m] – –	220 8.0 – –	17, 18, 20
36	hydroquinone 	*Desmodesmus armatus* *Microcystis aeruginosa* PCC7806 *Microcystis aeruginosa* 9110 *Monoraphidium braunii* *Nostoc* sp. *Phaeodactylum tricornutum* *Pseudokirchneriella subcapitata* *Synechococcus* sp. *Synechocystis* sp.	– – – – – – – – –	– – – – – – – – –	14 0.49 8.7[p] 100 1.9 0.18[o] 81 51[p] 6.2	1.5[n] 0.05[n] 0.96[p] 11[n] 0.21[n] 0.02[o] 8.9[n] 5.6[p] 0.68[n]	21-23
37	orfamide A 	*Chlamydomonas reinhardtii*	–	–	4.1	5.1[n]	8

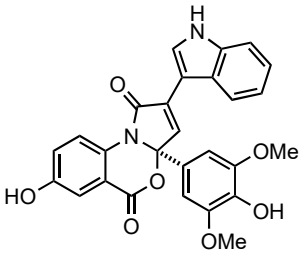
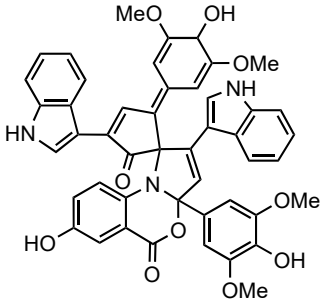
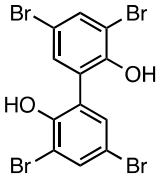
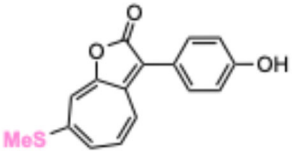
[m] Converted from µg/mL.
[n] Converted from µM.
[o] Converted from mol/L.
[p] Converted from mg/L.

39	L-phenylalanine 	*Microcystis aeruginosa*	–	–	360[q]	59	24
41	prolyl-methionine 	*Moina mongolica*	–	–	28000[r]	7000[r]	25
43	pyoluteorin 	*Anabaena cylindrica* *Chlamydomonas reinhardtii* *Desmodesmus subspicatus* *Microcystis aeruginosa* *Navicula pelliculosa*	– – – – –	– – – – –	0.62[s] 96 66 0.92[s] 2.5[s]	0.17[s] 26[t] 18[s] 0.25[s] 0.68[s]	8, 26
46	pyoluteorin B 	*Anabaena cylindrica* *Microcystis aeruginosa* *Navicula pelliculosa*	– – –	– – –	59[s] 14[s] 59[s]	14[s] 3.3[s] 14[s]	26
47	roseochelin B 	*Emiliania huxleyi* CCMP 374 *Emiliania huxleyi* B11	– –	– –	51 64	22.1[t] 27.7[t]	27
49	2,3,4,5-tetrabromopyrrole	*Emiliania huxleyi* *Heterosigma akashiwo*	– –	– –	0.09[u] 0.22[u]	0.04[w] 0.09[w]	28

[q] Converted from µg/mL.
[r] Converted from g/L.
[s] GI_{50} converted from µM.
[t] Converted from µM.
[u] Converted from nM.
[w] Converted from ng/mL.

		*Isochrysis galbana* *Mantoniella* sp. *Rhodomonas* sp. *Thalassiosira oceanica* *Thalassiosira pseudonana*	– – – – –	– – – – –	0.14[v] 0.06[v] 0.24[v] 0.19[v] 0.29[v]	0.06[x] 0.02[x] 0.09[x] 0.07[x] 0.11[x]	
44	pyrrolnitrin 	*Chalmydomonas reinhardtii*	–	–	20	5.1[y]	[8]
50	2,3,4-tribromopyrrole 	*Emiliania huxleyi*	–	–	0.11[v]	0.03[v]	[28]
51	pentabromopseudilin 	*Emiliania huxleyi*	–	–	0.001[v]	0.001[v]	[28]
53	sinacidin A 	*Emiliania huxleyi*	–	–	7.1	2.4[y]	[29]
54	sinacidin B 	*Emiliania huxleyi*	–	–	5.7	2.0[y]	[29]

[v] Converted from nM.
[x] Converted from ng/mL.
[y] Converted from μM.

55	sinatryptin A 	*Emiliania huxleyi*	–	–	6.9	3.3[z]	[29]
56	sinamicin A 	*Emiliania huxleyi*	–	–	8.2	6.6[z]	[29]
57	3,3',5,5'-tetrabromo-2,2'biphenyldiol 	*Phaeodactylum tricornutum*	–	–	3.6	1.8[z]	[30]
58	roseobacticide A (selected example) 	*Emiliania huxleyi* *Isochrysis* sp. *Tetraselmis suecica*	– – –	– – –	2.2 >35 >35	0.63[z] >10.0[z] >10.0[z]	[31]
89	*ortho*-tyrosine	*Heterosigma akashiwo*	–	–	1100[aa]	200	[20]

[z] Converted from μM.
[aa] Converted from μg/mL.

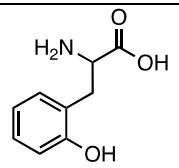
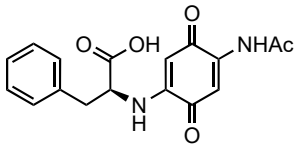
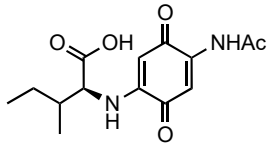
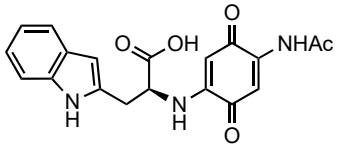
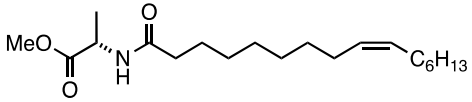
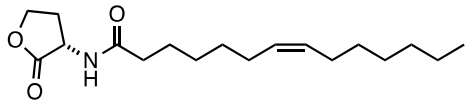
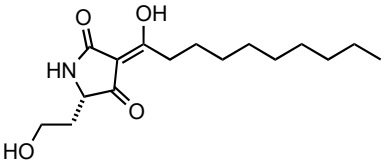
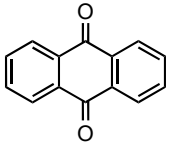
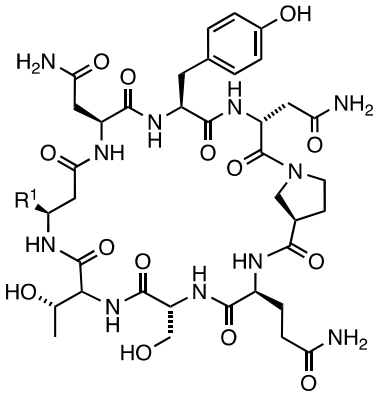
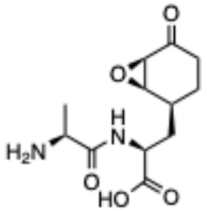
							

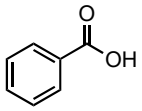
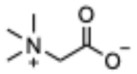
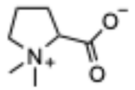
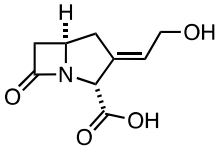
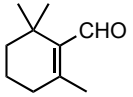
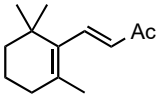
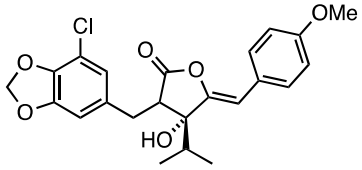
Table 2: Summary of bacteria-derived algaecides **not** involved in symbiotic algae-bacteria interactions.

Compound(s)		Algaecidal/Cyanobacteriocidal Activity					
No.	**Name/Structure**	**Alga/Cyanobacteria**	**MIC (μM)**	**MIC (ppm)**	**$IC_{50}/EC_{50}/LD_{50}$ LC_{50} (μM)**	**$IC_{50}/EC_{50}/LD_{50}$ LC_{50} (μg/mL)**	**Ref.**
90	abenquine A 	*Synechococcus elongatus*	–	–	9.6	3.2[bb]	[32]
91	abenquine B2 	*Synechococcus elongatus*	–	–	14	4.1[bb]	[32]
92	abenquine D 	*Synechococcus elongatus*	–	–	12	4.4[bb]	[32]
93	9*Z*-C16:1-NAME 	*Skeletonema costatum*	0.003[cc] –0.009[cc]	0.001[cc] –003[cc]	–	–	[33]
96	7*Z*-C14:1-HSL 	*Skeletonema costatum*	0.003[cc] –0.007[cc]	0.002[cc] –0.007[cc]	–	–	[33]

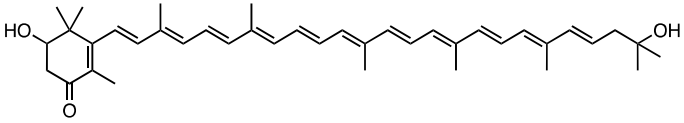
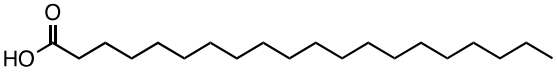
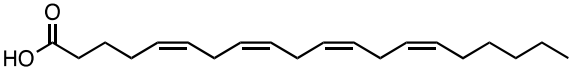
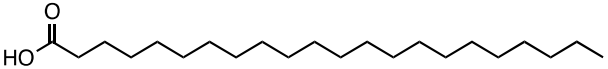
[bb] Converted from M.
[cc] Converted from nmol.

97	TA12 	*Phaeodactylum tricornutum*	20– 50	5.9– 14.9[dd]	–	–	[34]
103	9,10-anthraquinone 	*Oscillatoria* cf. *chalybea* *Oscillatoria perornata*	0.1 1.0	0.02[dd] 0.21[dd]	– 0.050[ee]	– 0.01[ee]	[35, 36]
105	bacillomycin D (R^1 = *n*-C14, *iso*-C15, *anteiso*-C15, *iso*-C16, *n*-C16) 	*Skeletonema costatum*	–	–	23[ff] (for R^1 = *n*-C14)	25	[37]
106	bacilysin 	*Anabaena flos-aquae* *Anabaena* sp. *Microcystis aeruginosa* *Nostoc* sp.	– – – –	– – – –	16[gg] 19[gg] 15[gg] 17[gg]	4.3[gg] 5.0[gg] 4.1[gg] 4.5[gg]	[38]

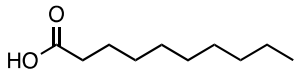
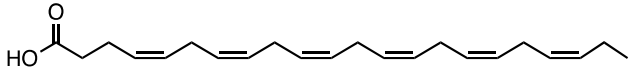
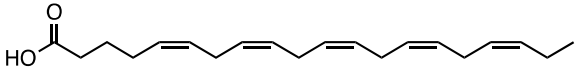
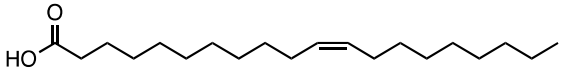
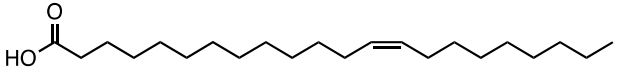
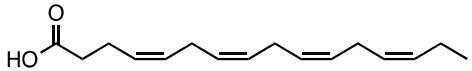
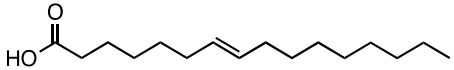
[dd] Converted from µM.
[ee] Converted from nM.
[ff] Converted from µg/mL.
[gg] Converted from mg/L.

107	benzoic acid 	*Karenia mikimotoi*	–	–	250[hh]	30	[39]
108	trimethylglycine 	*Alexandrium tamarense* *Chattonella marina* *Karenia mikimotoi*	– – –	– – –	940[ii] >1700[ii] >850[ii]	110[ii] >200[ii] >100[ii]	[40]
109	stachydrine 	*Alexandrium tamarense* *Chattonella marina* *Karenia mikimotoi*	– – –	– – –	130–1200[ii] >1400[ii] >1400[ii]	18–170[ii] >200[ii] >200[ii]	[40]
110	clavulanic acid 	*Microcystis aeruginosa*	2.0[ii]	0.40[ii]	–	–	[41]
111	β-cyclocitral 	*Microcystis* sp.	2000[ij]	300[ij]	–	–	[42]
112	β-ionone 	*Microcystis* sp.	2500[ij]	480[ij]	–	–	[42]
115	cyanobactin 	*Anabaena* sp. *Anabaena variabilis* *Ankistrodesmus acicularis* *Aphanocapsa* sp. *Aphanizomenon* sp. *Chlamydomonas gloeogama* *Chlorella intermedium*	0.70[hh] 1.2[hh] 2.3[hh] 2.3[hh] 1.4[hh] 46[hh] 23[hh]	0.30[hh] 0.50[hh] 1.0[hh] 1.0[hh] 0.60[hh] 20[hh] 10[hh]	– – – – – – –	– – – – – – –	[43-45]

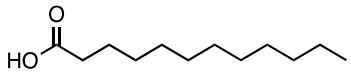
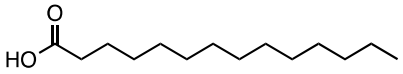
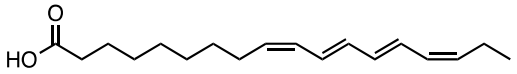
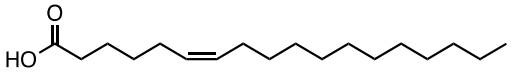
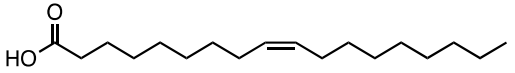
[hh] Converted from μg/mL.
[ii] Converted from mg/L.
[ij] Converted from mM.

		Chlorella vulgaris	4.6[hh]	2.0[ll]	–	–	
		Coelastrum proboscideum	12[hh]	5.0[ll]	–	–	
		Cosmarium sp.	10[hh]	4.5[ll]	–	–	
		Euglena gracilis	4.6	2.0[mm]	–	–	
		Kirchneriella obesa	4.6[hh]	2.0[ll]	–	–	
		Microcystis aeruginosa	0.19[hh]	0.08[ll]	–	–	
		Nostoc boryanum	13[hh]	5.6[ll]	–	–	
		Nostoc punctiforme	1.2[hh]	0.50[ll]	–	–	
		Nostoc sp.	1.6[hh]	0.70[ll]	–	–	
		Phormidium tenuissimum	3.2[hh]	1.4[ll]	–	–	
		Scendesmus obliquus	4.6[hh]	2.0[ll]	–	–	
		Scytonema hofmanni	4.6	2.0	–	–	
		Synechococcus sp. ATCC 27146	0.03[kk]	0.05[kk]	–	–	
		Synechococcus sp. Gromov 1978/768	2.3[hh]	1.0[ll]	–	–	
		Synechococcus sp. R-2 PCC7942	2.3[hh]	1.0[ll]	–	–	
		Synechocystis aquatilis	13[hh]	5.6[ll]			
116	deinoxanthin 	*Alexandrium tamarense*	–	–	9.6[ll]	5.6	[46]
118	arachidic acid 	*Chattonella marina*	–	–	110[ll]	34	[47]
		Heterosigma akashiwo	–	–	300[ll]	94	
119	arachidonic acid 	*Chattonella marina*	–	–	7.6[ll]	2.3	[47]
		Heterosigma akashiwo	–	–	23[ll]	6.9	
120	behenic acid 	*Chattonella marina*	–	–	160[ll]	53	[47]

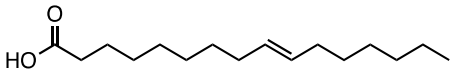
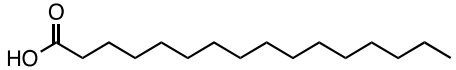
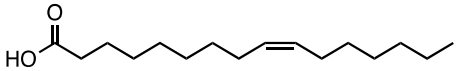
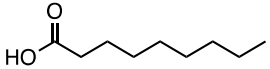
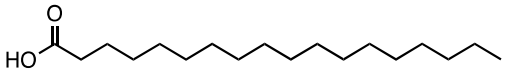
[kk] Converted from nM and ng/mL.
[ll] Converted from µg/mL.
[mm] Converted from µM.

122	decanoic acid 	*Haematococcus pluvialis* *Navicula pelliculosa*	29[nn] 290[nn]	5.0[nn] 50[nn]	– –	– –	[48]
123	docosahexaenoic acid 	*Chattonella marina* *Chlorella vulgaris* *Heterosigma akashiwo* *Monoraphidium contortum*	– – – –	– – – –	22[oo] 280[nn] 13[oo] 240[nn]	7.2 91[nn] 4.4 80[nn]	[47, 49]
124	eicosapentaenoic acid 	*Chattonella marina* *Chlorella vulgaris* *Heterosigma akashiwo* *Monoraphidium contortum* *Prorocentrum micans* *Skeletonema costatum*	– – – – – –	– – – – – –	22[oo] 430[nn] 1.4–6.9[oo] 330[nn] 1.8 1.8	6.8 130[nn] 0.41[nn]–2.1 100[nn] 0.53[nn] 0.55[nn]	[47, 49, 50]
126	eicosenoic acid 	*Chattonella marina*	–	–	140[oo]	44	[47]
128	erucic acid 	*Chattonella marina*	–	–	140[oo]	46	[47]
129	hexadecatetraenoic acid 	*Chattonella marina* *Heterosigma akashiwo*	– –	– –	16[oo] 3.3[oo]	4.0 0.83	[47]
130	7-hexadecanoic acid 	*Heterosigma akashiwo* *Prorocentrum micans* *Skeletonema costatum*	190 200 220	48[nn] 51[nn] 56[nn]	– – –	– – –	[50]

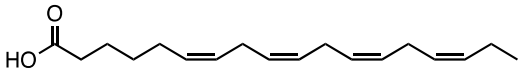
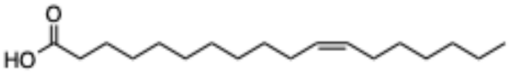
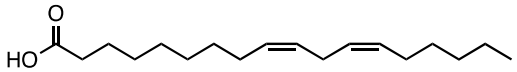
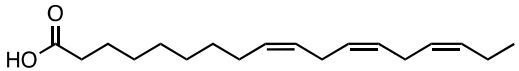
[nn] Converted from mg/L.
[oo] Converted from µg/mL.

131	lauric acid 	*Anacystis nidulans* *Chlamydomonas reinhardtii* *Haematococcus pluvialis* *Navicula pelliculosa*	50[pp] 120[pp] 25[pp] 25[pp]	10[pp] 25[pp] 5.0[pp] 5.0[pp]	– – – –	– – – –	[48]
132	mystyric acid 	*Anacystis nidulans* *Chlamydomonas reinhardtii* *Haematococcus pluvialis* *Navicula pelliculosa*	18[pp] 18[pp] 22[pp] 22[pp]	4.0[pp] 4.0[pp] 5.0[pp] 5.0[pp]	– – – –	– – – –	[48]
134	octadecatetraenoic acid 	*Chattonella marina* *Heterosigma akashiwo*	– –	– –	19[qq] 6.9[qq]	5.3 1.9	[47]
134	6-octadecenoic acid 	*Microsytis aeruginosa*	–	–	12[pp]	3.3[pp]	[51]
135	oleic acid 	*Anacystis nidulans* *Chattonella marina* *Chlamydomonas reinhardtii* *Chlorella* sp. *Haematococcus pluvialis* *Heterosigma akashiwo* *Microsytis aeruginosa* *Monoraphidium contortum* *Navicula pelliculosa* *Pediastrum simplex* *Phormidium tenue* *Prorocentrum micans* *Skeletonema costatum*	14[pp] – 18[pp] – 11[pp] 64[pp] – – 14[pp] – 3.5[pp] 74[pp] 81[pp]	4.0[pp] – 5.0[pp] – 3.0[pp] 18[pp] – – 4.0[pp] – 1.0[pp] 21[pp] 23[pp]	– 89[qq] – 42[rr] – 120[qq] 5.7[rr] 42[rr] – 71[rr] – – –	– 25 – 12[rr] – 34 1.6[rr] 12[rr] – 20[rr] – – –	[47, 48, 50-53]

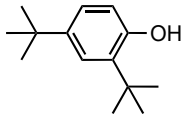
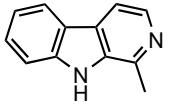
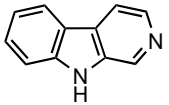
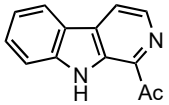
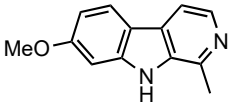
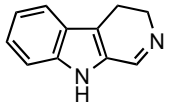
[pp] Converted from mg/L.
[qq] Converted from µg/mL.
[rr] Converted from mg/mL.

136	palmitelaidic acid 	*Heterosigma akashiwo*	–	–	170[ss]	44	[47]
137	palmitic acid 	*Anacystis nidulans*	19[tt]	5.0[tt]	–	–	[47-50, 52]
		Chlamydomonas reinhardtii	12[tt]	3.0[tt]	–	–	
		Chattonella marina	–	–	120[ss]	30	
		Chlorella sp.	–	–	230000[tt]	59000[tt]	
		Chlorella vulgaris	97[tt]	25[tt]	230[tt]	59[tt]	
		Haematococcus pluvialis	12[tt]	3.0[tt]	–	–	
		Heterosigma akashiwo	270[tt]	68[tt]	310[ss]	79	
		Monoraphidium contortum	–	–	36[tt]	9.2[tt]	
		Navicula pelliculosa	12[tt]	3.0[tt]	–	–	
		Prorocentrum micans	280[tt]	72[tt]	–	–	
		Skeletonema costatum	300[tt]	78[tt]	–	–	
		Pediastrum simplex	–	–	700000[tt]	180000[tt]	
138	palmitoleic acid 	*Alexandrium tamarense*	79[ss]	20[ss]	–	–	[47, 50, 53, 54]
		Chattonella marina	–	–	79[ss]	20	
		Heterosigma akashiwo	170[tt]	42[tt]	29[ss]	7.3	
		Phormidium tenue	9.8[uu]	2.5	–	–	
		Prorocentrum micans	170[tt]	43[tt]	–	–	
		Skeletonema costatum	180[tt]	45[tt]	–	–	
139	pelargonic acid 	*Anacystis nidulans*	630[tt]	100[tt]	–	–	[48, 51]
		Haematococcus pluvialis	30[tt]	5[tt]	–	–	
		Microcystis aeruginosa	–	–	3.2	0.5[tt]	
		Navicula pelliculosa	320[tt]	50[tt]	–	–	
140	stearic acid 	*Chattonella marina*	–	–	100[ss]	29	[47-49]
		Chlorella vulgaris	–	–	700[tt]	200[tt]	
		Chlamydomonas reinhardtii	18[tt]	5.0[tt]	–	–	
		Haematococcus pluvialis	18[tt]	5.0[tt]	–	–	
		Heterosigma akashiwo	–	–	270[ss]	78	
		Monoraphidium contortum	–	–	622[tt]	177[tt]	

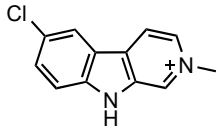
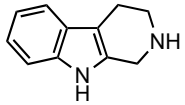
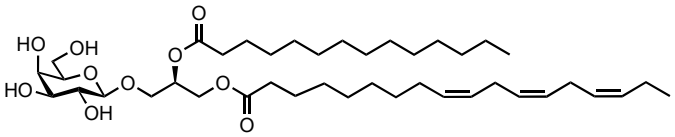
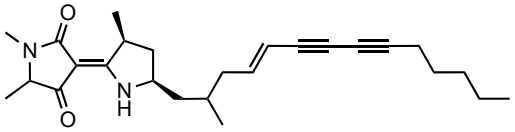
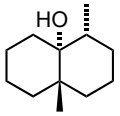
[ss] Converted from µg/mL.
[tt] Converted from mg/L.
[uu] Converted from ppm.

		Navicula pelliculosa	18[vv]	5.0[vv]	–	–	
141	stearidonic acid 	*Heterosigma akashiwo* *Prorocentrum micans* *Skeletonema costatum*	15[vv] 17[vv] 18[vv]	4.2[vv] 4.7[vv] 4.9[vv]	5.1[ww] – –	1.4 – –	50, 55
142	*cis*-vaccenic acid 	*Phormidium tenue*	18[xx]	5.0	–	–	53
143	linoleic acid 	*Anacystis nidulans* *Chattonella marina* *Chlamydomonas reinhardtii* *Chlorella* sp. *Haematococcus pluvialis* *Heterosigma akashiwo* *Monoraphidium contortum* *Navicula pelliculosa* *Pediastrum simplex* *Phormidium tenue* *Prorocentrum micans* *Skeletonema costatum*	11[vv] – 18[vv] – 7.1[vv] 46[vv] – 11[vv] – 1.8[xx] 53[vv] 50[vv]	3.0[vv] – 5.0[vv] – 2.0[vv] 13[vv] – 3.0[vv] – 0.5 15[vv] 14[vv]	– 86[ww] – 34000[yy] – 12[ww] 29000[yy] – 50000[yy] – – –	– 24 – 9400[yy] – 3.5 8000[yy] – 14000[yy] – – –	47, 48, 50, 52, 53, 55
144	linolenic acid 	*Chattonella marina* *Chlorella* sp. *Heterosigma akashiwo* *Monoraphidium contortum* *Pediastrum simplex* *Prorocentrum micans* *Skeletonema costatum*	– – 20[vv] – – 21[vv] 27[vv]	– – 5.6[vv] – – 5.9[vv] 7.4[vv]	25[ww] 36000[yy] 4.0[ww]–9.3[ww] 54000[yy] 57000[yy] – –	7.1 10000[yy] 1.1–2.6 15000[yy] 16000[yy] – –	47, 50, 52, 53, 55

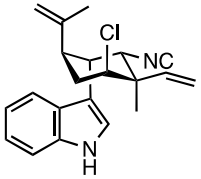
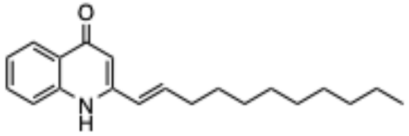
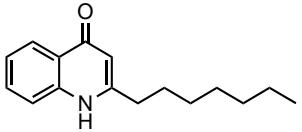
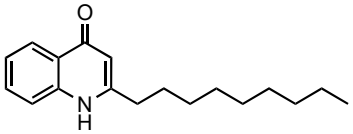
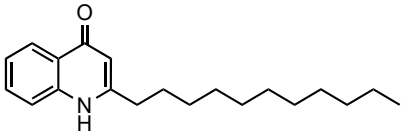
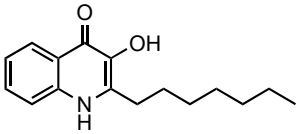
[vv] Converted from mg/L.
[ww] Converted from µg/mL.
[xx] Converted from ppm.
[yy] Converted from mg/mL.

117	2,4-di-*tert*-butylphenol 	*Microcystis aeruginosa*	0.05[zz]	0.01[zz]	–	–	[56]
161	Harmane 	*Arthrospira laxissima* *Chroococcus minutus* *Nostoc carneum* *Nostoc insulare* *Synechocystis aquatilis* *Synechococcus* sp.	0.50 3.0 4.0 9.0 4.0 1.5[aaa]	0.09[aaa] 0.55[aaa] 0.73[aaa] 1.6[aaa] 0.73[aaa] 0.27[aaa]	– – – – – –	– – – – – –	[57]
162	norharmane 	*Arthrospira laxissima* *Merismopedia tenuissima* *Nostoc carneum* *Nostoc insulare* *Oscillatoria limnetica* *Synechocystis aquatilis* *Synechococcus* sp.	1.0 – 3.8 4.0 – 3.3 3.3	0.17[aaa] – 0.64[aaa] 0.67[aaa] – 0.56[aaa] 0.56[aaa]	76[bbb] – – 76[bbb] – – 	13 – – 13 – – 	[57, 58]
163	1-acetyl-ß-carboline 	*Akashiwo sanguinea* *Chlorella marina* *Prorocentrum minimum*	–	–	≈48[bbb]	≈10	[59]
164	harmine 	*Merismopedia tenuissima* *Oscillatoria limnetica*	– –	– –	57[bbb] 52[bbb]	12 11	[58]
165	norharmalane 	*Arthrospira laxissima* *Chroococcus minutus* *Nostoc carneum* *Nostoc insulare* *Synechocystis aquatilis* *Synechococcus* sp.	1.5 7.0 1.8 12 14 12	0.26[aaa] 1.2[aaa] 0.31[aaa] 2.0[aaa] 2.4[aaa] 2.0[aaa]	– – – – – –	– – – – – –	[57]

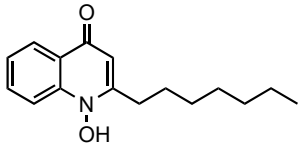
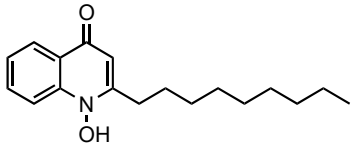
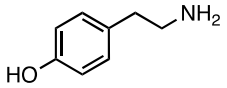
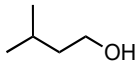
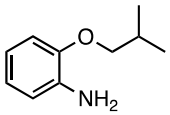
[zz] Converted from mg/L.
[aaa] Converted from µg.
[bbb] Converted from µg/mL.

166	nostocarboline 	*Kirchneriella contorta* *Microcystis aeruginosa* *Synechococcus* sp.	1.0 1.0 1.0	0.2[ccc] 0.2[ccc] 0.2[ccc]	– – –	– – –	[60]
167	tryptoline 	*Anabaena* sp. *Aphanizomenon* sp. *Microcystis* sp. FACHB-905 *Microcystis* sp. FACHB-1112 *Microcystis* sp. FACHB-1284 *Microcystis* sp. FACHB-1285 *Nostoc* sp. *Synechococcus* sp.	– – – – – – – –	– – – – – – – –	9.9[ddd] 12[ddd] 15[ddd] 5.6[ddd] 14[ddd] 7.0[ddd] 16[ddd] 3.4[ddd]	1.7 2.0 2.5 0.96 2.4 1.2 2.8 0.58	[61]
151	Monogalactosyl diglyceride (select example) 	*Pseudoblepharisma tenue*	14[eee]–36[eee]	10–26	–	–	[62, 63]
145	fischerellin A 	*Scenedesmus obliquus* *Scenedesmus subspicatus* *Synechococcus* sp.	0.50 0.50 0.01[ggg]	0.20[ccc] 0.20[ccc] 0.004[fff]	–	–	[64]
148	geosmin 	*Microcystis* sp.	3000[ggg]	550[mmm]	–	–	[42]

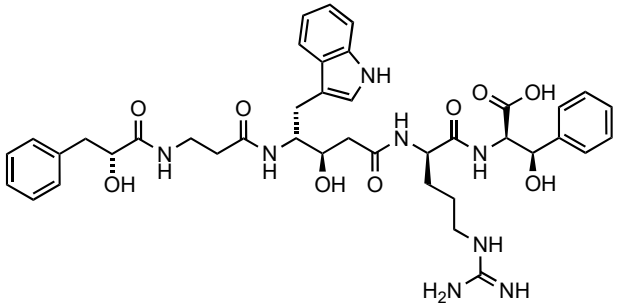
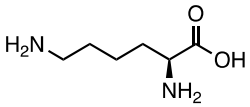
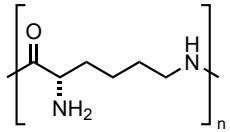
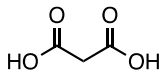
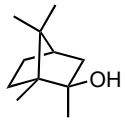
[ccc] Converted from µM.
[ddd] Converted from µg/mL.
[eee] Converted from ppm.
[fff] Converted from nM.
[ggg] Converted from mM.

159	12-*epi*-hapalindole E 	*Anabaena doliolum* *Monoraphidium convolutum*	– –	– –	23 23	7.8[hhh] 7.8[hhh]	65
170	*E*-2-(undec-1-en-1-yl)quinolin-4(1H)-one 	*Alexandrium tamarense* *Cochlodinium polykrikoides* *Heterosigma akashiwo*	9.7[iii] 8.4[iii] 3.7[iii]	2.9[iii] 2.5[iii] 1.1[iii]	3.7[iii] 2.7[iii] 1.7[iii]	1.1 0.8 0.5	66
168	2-heptylquinolin-4(1H)-one 	*Achnanthidium minutissimum* *Cylindrotheca closterium* *Emiliania huxleyi* 624 *Emiliania huxleyi* 374 *Emiliania huxleyi* 379 *Phaeodactylum tricornutum*	– – – – – –	– – – – – –	1.5 1.2 0.4[jjj] 0.16[jjj] 0.49[jjj] 4.9	0.37[hhh] 0.30[hhh] 0.09[jjj] 0.04[jjj] 0.12[jjj] 1.2[hhh]	67, 68
169	2-nonylquinolin-4(1H)-one 	*Achnanthidium minutissimum* *Cylindrotheca Closterium* *Phaeodactylum tricornutum*	– – –	– – –	1.4 0.16 1.1	0.38[rr] 0.04[rr] 0.30[rr]	67
172	2-undecyl-4-quinolone 	*Alexandrium tamarense* *Cochlodinium polykrikoides* *Heterosigma akashiwo*	13[iii] 12[iii] 5.3[iii]	3.9[iii] 3.5[iii] 1.6[iii]	4.7[iii] 4.0[iii] 2.3[iii]	1.4 1.2 0.7	66
173	2-heptyl-3-hydroxyquinolin-4(1H)-one 	*Achnanthidium minutissimum* *Cylindrotheca closterium* *Phaeodactylum tricornutum*	– – –	– – –	22 20 14	5.7[hhh] 5.2[hhh] 3.6[hhh]	67

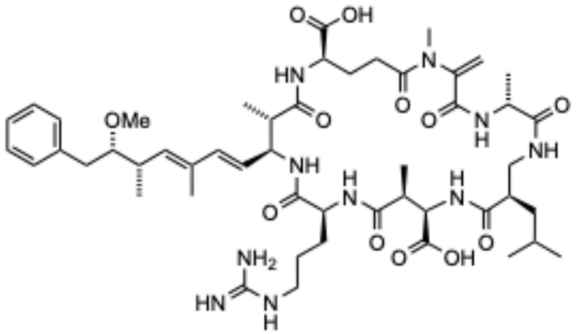
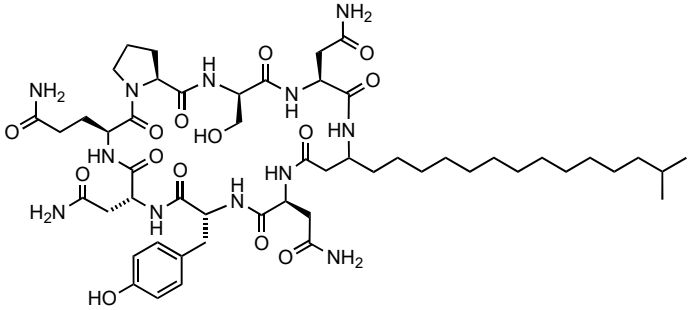
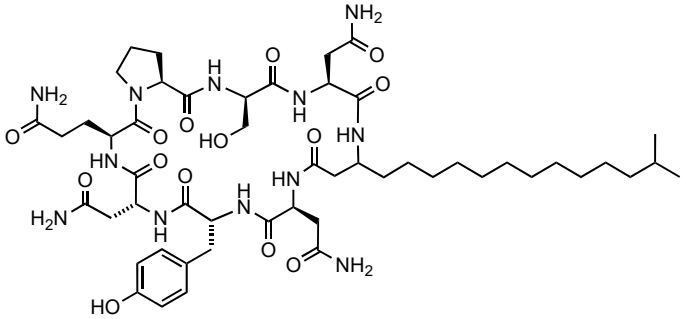
[hhh] Converted from µM.
[iii] Converted from µg/mL.
[jjj] Converted from nM/mL.

174	2-heptyl-1-hydroxyquinolin-4(1H)-one 	*Achnanthidium minutissimum* *Cylindrotheca Closterium* *Phaeodactylum tricornutum*	– – –	– – –	82 13 62	21[kkk] 3.4[kkk] 16[kkk]	[67]
175	1-hydroxy-2-nonylquinolin-4(1H)-one 	*Achnanthidium minutissimum* *Cylindrotheca closterium* *Phaeodactylum tricornutum*	– – –	– – –	14 0.96 6.2	4.0[kkk] 0.28[kkk] 1.8[kkk]	[67]
177	4-hydroxyphenethylamine 	*Chlorella pyrenoidosa* *Microcystis aeruginosa* *Scenedesmus obliquus*	– – –	– – –	210[lll]–410[lll] 73[lll]–170[lll] 230[lll]–580[lll]	29–56[lll] 10–23[lll] 31–80[lll]	[69]
178	isoamyl alcohol 	*Microcystis* sp.	200000 [mmm]	18000[m] [mm]	–	–	[42]
179	2-(isobutoxyphenyl)amine 	*Alexandrium tamarense*	–	–	<120[nnn]	<20	[70]
180	kasumigamide	*Chlamydomonas neglecta*	2.5[nnn]	2.0[nnn]	–	–	[71]

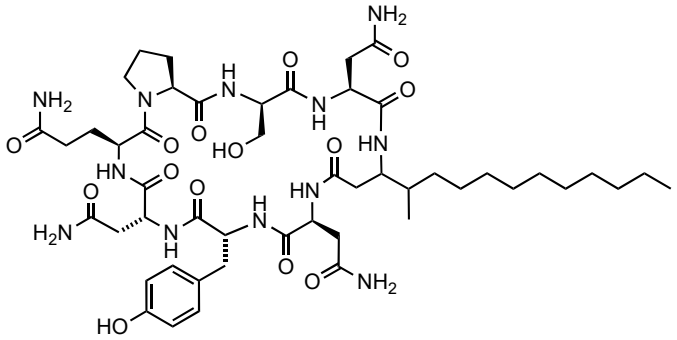
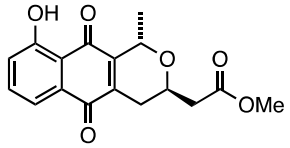
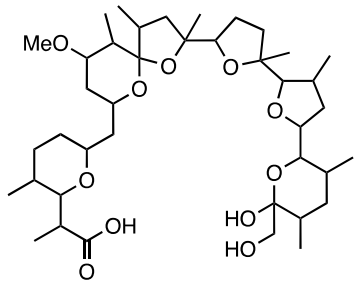
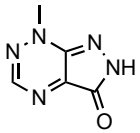
[kkk] Converted from µM.
[lll] Converted from mg/L.
[mmm] Converted from mM.
[nnn] Converted from µg/mL.

							
186	L-lysine 	*Anabaena ucrainica* *Microcystis aeruginosa* NIES 112 *Microcystis aeruginosa* NIES 298 *Microcystis aeruginosa* FACHB-905 *Microcystis viridis*	89[ooo] 41[ooo] 75[ooo] 68[ppp] 0.68[ooo] −68[ooo]	13[ooo] 6.0[ooo] 11[ooo] 10[ppp] 0.10[ooo] −10[ooo]	– – – – – 	– – – – – 	41, 72, 73
187	*ε*-polylysine 	*Alexandrium tamarense* *Chattonella marina* *Karenia mikimotoi*	– – –	– – –	– – –	300[ppp] 51[ppp] >300[ppp]	40
188	malonic acid 	*Microcystis viridis*	4.8[qqq]	0.5	–	–	73
102	2-methylisoborneol 	*Microcystis* sp.	2500[rrr]	420[rrr]	–	–	42

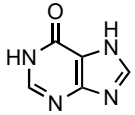
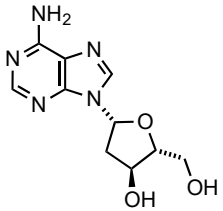
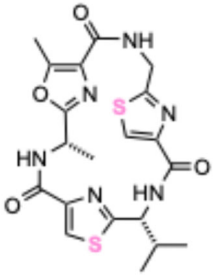
[ooo] Converted from µg/mL.
[ppp] Converted from mg/L.
[qqq] Converted from ppm.
[rrr] Converted from mM.

2	microcystin-LR 	*Anabaena* sp. *Nostoc muscorum*	– –	– –	≈25[sss] 25[sss]	≈25[ttt] 25	[74]
194	mycosubtilin MS1084 	*Alexandrium tamarense* *Chattonella antiqua* *Cochlodinium polykrikoides* *Gymnodinium impudicum* *Gymnodinium sanguineum* *Heterocapsa triquetra* *Heterosigma akashiwo* *Prorocentrum dentatum* *Prorocentrum micans* *Prorocentrum minimum* *Prorocentrum triestinum*	– – – – – – – – – – –	– – – – – – – – – – –	5.1[sss] 0.64[sss] 0.50[sss] 0.73[sss] 5.4[sss] 1.2[sss] 1.5[sss] 0.64[sss] 2.9[sss] 5.6[sss] 2.2[sss]	5.6 0.70 0.60 0.80 5.9 1.3 1.6 0.70 3.2 6.2 2.4	[75]
195	mycosubtilin MS1070 	*Alexandrium tamarense* *Chattonella antiqua* *Cochlodinium polykrikoides* *Gymnodinium impudicum* *Gymnodinium sanguineum* *Heterocapsa triquetra* *Heterosigma akashiwo* *Prorocentrum dentatum* *Prorocentrum micans* *Prorocentrum minimum* *Prorocentrum triestinum*	– – – – – – – – – – –	– – – – – – – – – – –	3.9[sss] 1.2[sss] 0.74[sss] 0.46[sss] 0.55[sss] 0.83[sss] 1.1[sss] 1.1[sss] 2.6[sss] 5.5[sss] 1.9[sss]	4.2 1.3 0.80 0.50 0.60 0.90 1.2 1.2 2.8 6.0 2.1	[75]

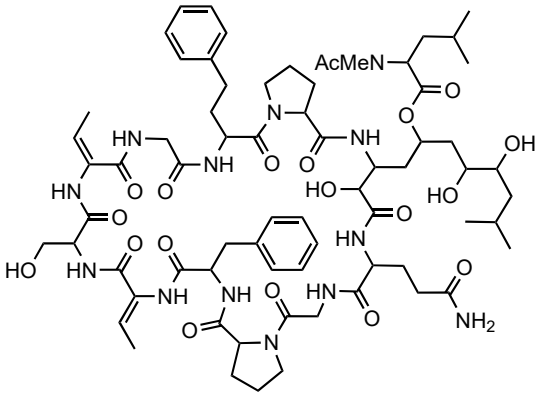
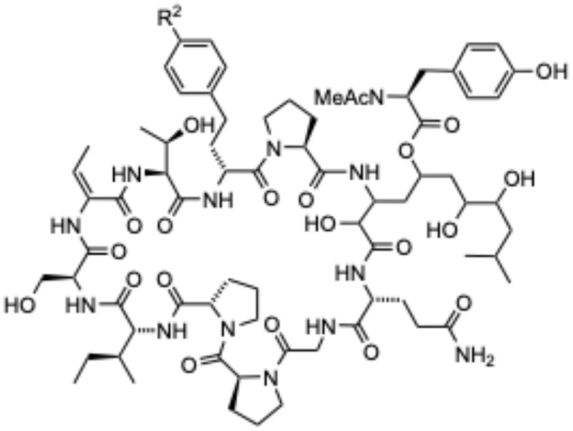
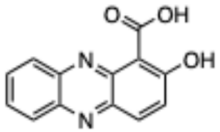
[sss] Converted from µg/mL.
[ttt] 43% inhibition at 25 µg/mL.

196	mycosubtilin MS1056 	*Alexandrium tamarense* *Chattonella antiqua* *Cochlodinium polykrikoides* *Gymnodinium impudicum* *Gymnodinium sanguineum* *Heterocapsa triquetra* *Heterosigma akashiwo* *Prorocentrum dentatum* *Prorocentrum micans* *Prorocentrum minimum* *Prorocentrum triestinum*	– – – – – – – – – – –	– – – – – – – – – – –	8.2[uuu] 9.1[uuu] 2.2[uuu] 0.57[uuu] 10[uuu] 2.2[uuu] 3.2[uuu] 1.3[uuu] 4.0[uuu] 12[uuu] 1.7[uuu]	8.7 9.6 2.3 0.60 12 2.3 3.4 1.4 4.2 13 1.8	[75]
197	nanaomycin A methyl ester 	*Microcystis aeruginosa*	–	–	9.5[vvv]	3.0[vvv]	[76]
198	NIG355 	*Alexandrium tamarense* *Chlorella autotrophica* *Phaeocystis globosa*	2.8[www] >14[www] 0.69[www]	2.0[www] >10[www] 0.5[www]	– – –	– – –	[77]
199	nostocine A 	*Anabaena cylindrica* *Anabaena variabilis* *Chlamydomonas reinhardtii* *Chlamydomonas* sp. *Chlorella fusca*	30 30 30 >50 5.0	4.5[xxx] 4.5[xxx] 4.5[xxx] >7.6[xxx] 0.76[xxx]	– – – – –	– – – – –	[78]

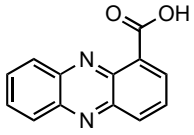
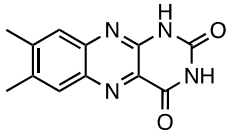
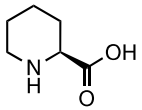
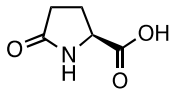
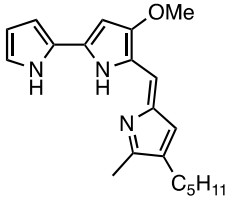
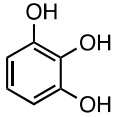
[uuu] Converted from µg/mL.
[vvv] Converted from mg/L.
[www] Converted from µg/mL.
[xxx] Converted from µM.

		Chlorella pyrenoidosa *Dunaliella salina* *Dunaliella tertiolecta* *Nostoc commune* *Nostoc muscorum* *Nostoc spongiaeforme* *Scytonema schmidlei* *Oscillatoria* sp.	30 15 20 20 >50 >50 >50 >50	4.5[yyy] 2.3[yyy] 3.0[yyy] 3.0[yyy] >7.6[yyy] >7.6[yyy] >7.6[yyy] >7.6[yyy]	– – – – – – – –	– – – – – – – –	
40	hypoxanthine 	*Moina mongolica*	–	–	100000[zzz]	14000[zzz]	[25]
200	2’-deoxyadenosine 	*Microcystis aeruginosa*	–	–	26	6.4	[79]
201	nostocyclamide 	*Anabaena variabilis* *Scenedesmus subspicatus*	0.1 1.0	0.05[aaaa] 0.47[aaaa]	– –	– –	[80]

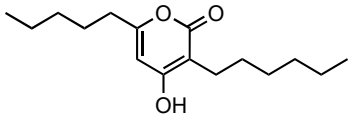
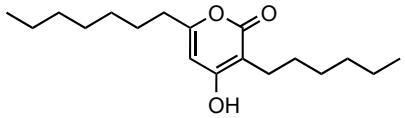
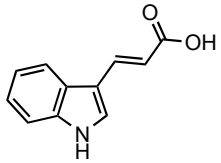
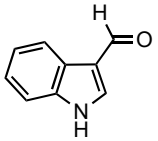
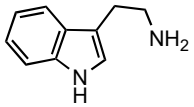
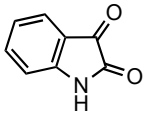
[yyy] Converted from µM.
[zzz] Converted from g/L.
[aaaa] Converted from µM.

203	pahayokolide A 	*Chlamydomonas* sp.	7.0[bbb]	10[bbbb]	–	–	[81]
204 + **205**	portoamide A (R^2 = OMe) portoamide B (R^2 = H) 	*Chlorella vulgaris* *Ankistrodesmus falcatus* *Chlamydomonas reinhardtii* *Cylindrospermopsis raciborskii*	– – – –	– – – –	8.7[bbb] 17[bbb] 8.7[bbb] 19[bbb] (for R^2 = H)	13 25 13 28	[82]
206	2-hydroxyphenazine-l-carboxylic acid 	*Anabaena flos-aquae* *Microcystis aeruginosa*	4.2[bbb] 0.42[bbb]	1.0 0.10	– –	– –	[83]

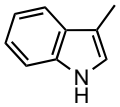
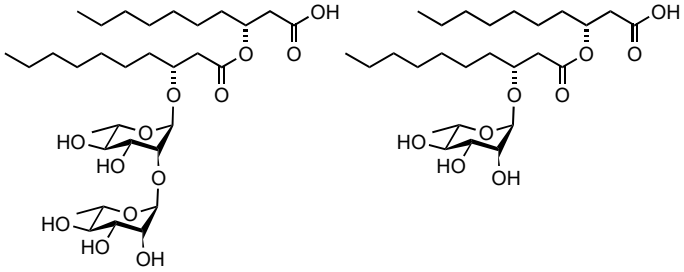
[bbbb] Converted from μg/mL.

207	phenazine-1-carboxylic acid 	*Anabaena flos-aquae*	45[cccc]	10	–	–	[83]
210	lumichrome 	*Microcystis* spp.	<0.004[d] [ddd]	<0.001 [dddd]	–	–	[84]
211	L-pipecolic acid 	*Microcystis aeruginosa*	39[eeee]	5.0[eeee]	–	–	[85]
212	L-pyroglutamic acid 	*Microcystis aeruginosa*	390[eeee]	50[eeee]	–	–	[85]
214	prodigiosin 	*Chlorella vulgaris*	–	–	87–99	28–32	[86]
218	pyrogallol 	*Microcystis aeruginosa*	4.0	0.5[eeee]	5.6[eeee]	0.7[eeee]	[87, 88]

[cccc] Converted from μg/mL.
[dddd] Converted from nM.
[eeee] Converted from mg/L.

215	pseudopyronine A 	*Alexandrium tamarense* *Cochlodinium polykrikoides* *Heterosigma akashiwo*	20[ffff] 9.4[ffff] 13[ffff]	5.3[ffff] 2.5[ffff] 3.4[ffff]	7.5[ffff] 3.4[ffff] 3.8[ffff]	2.0 0.9 1.0	[66]
216	pseudopyronine B 	*Alexandrium tamarense* *Cochlodinium polykrikoides* *Heterosigma akashiwo*	13[ffff] 5.8[ffff] 9.8[ffff]	3.7[ffff] 1.7[ffff] 2.9[ffff]	5.1[ffff] 2.0[ffff] 2.7[ffff]	1.5 0.6 0.8	[66]
222	indole-3-acrylic acid 	*Microcystis aeruginosa*	2.7	0.50[gggg]	–	–	[89]
226	indole-3-carboxaldehyde 	*Microcystis aeruginosa*	–	–	45	6.6	[15]
227	tryptamine 	*Aphanizomenon* sp. *Anabaena* sp. *Microcystis* sp. FACHB-905 *Microcystis* sp. FACHB-1112 *Microcystis* sp. FACHB-1284 *Microcystis* sp. FACHB-1285 *Nostoc* sp. *Synechococcus* sp.	– – – – – – – –	– – – – – – – –	26[ffff] 21[ffff] 19[ffff] 14[ffff] 23[ffff] >31[ffff] 28[ffff] 11[ffff]	4.2 3.3 3.0 2.3 3.7 >5.0 4.5 1.8	[61]
228	2,3-indolinedione (isatin) 	*Microcystis aeruginosa* *Synechococcus* sp.	– –	– –	88[ffff] 230[ffff]	13 34	[12]

[ffff] Converted from µg/mL.
[gggg] Converted from mg/L.

230	3-methylindole 	*Microcystis aeruginosa*	–	–	8.4[hhhh]	1.1	[11]
219 + **220**	dirhamnolipids, monorhamnolipid 	*Gymnodinium* sp. *Heterosigma akashiwo* *Prorocentrum dentatum*	– – –	– – –	– – –	>11.3[iiii] 1.9[iiii] 5.0[iiii]	[90]

1. S. Umetsu, M. Kanda, I. Imai, R. Sakai and M. J. Fujita, *Molecules*, 2019, **24**, 4522-4544.
2. R. Hibayashi and N. Imamura, *J. Antibiot.*, 2003, **56**, 154-159.
3. T. Yamaguchi, Y. Kobayashi, K. Adachi and N. Imamura, *J. Antibiot.*, 2003, **56**, 655-657.
4. B. Wang, Y. Tao, Q. Liu, N. Liu, Z. Jin and X. Xu, *Mar. Drugs*, 2017, **15**, 247-256.
5. C. Churro, E. Alverca, F. Sam-Bento, S. Paulino, V. C. Figueira, A. J. Bento, S. Prabhakar, A. M. Lobo, A. J. Calado and P. Pereira, *J. Appl. Phycol.*, 2009, **21**, 429-442.
6. S.-Y. Jeong, K. Ishida, Y. Ito, S. Okada and M. Murakami, *Tetrahedron Lett.*, 2003, **44**, 8005-8007.
7. Y. Lan, Q. Chen, T. Gou, K. Sun, J. Zhang, D. Sun and S. Duan, *Water*, 2020, **12**, 3256-3274.
8. M. M. Rose, D. Scheer, Y. Hou, V. S. Hotter, A. J. Komor, P. Aiyar, K. Scherlach, F. Vergara, Q. Yan, J. E. Loper, T. Jakob, N. M. van Dam, C. Hertweck, M. Mittag and S. Sasso, *Environ. Microbiol.*, 2021, **23**, 5525-5540.
9. J. Zhu, W. Jiang, L. Miao, C. Jin and W. Bao, *Acta Microbiol. Sin.*, 2013, **53**, 825-831.
10. J. Y. Cho, J. Y. Kang, Y. K. Hong, H. H. Baek, H. W. Shin and M. S. Kim, *Biosci. Biotechnol. Biochem.*, 2012, **76**, 1116-1121.
11. X. Guo, X. Liu, L. Wu, J. Pan and H. Yang, *Environ. Microbiol.*, 2016, **18**, 3867-3883.
12. Z. Li, S. Lin, X. Liu, J. Tan, J. Pan and H. Yang, *Appl. Microbiol. Biotechnol.*, 2014, **98**, 4737-4748.
13. Z. Li, M. Geng and H. Yang, *Appl. Microbiol. Biotechnol.*, 2015, **99**, 981-990.
14. Y. Wang, S. Li, G. Liu, X. Li, Q. Yang, Y. Xu, Z. Hu, C. Y. Chen and J. S. Chang, *Bioresour. Technol.*, 2020, **295**, 122246-122252.
15. L. Wu, X. Guo, X. Liu and H. Yang, *Front. Microbiol.*, 2017, **8**, 1-13.

[hhhh] Converted from μg/mL.
[iiii] Converted from mg/L.

16. X. Guo, X. Liu, J. Pan and H. Yang, *Sci. Rep.*, 2015, **5**, 14720-14732.
17. L. Zhao, L. Chen and P. Yin, *J. Ind. Microbiol. Biotechnol.*, 2014, **41**, 593-599.
18. L. Zhuang, L. Zhao and P. Yin, *RSC Adv.*, 2018, **8**, 12760-12766.
19. Q. Zhu, B. Wu and L. Zhao, *Ecotoxicol. Environ. Saf.*, 2021, **208**, 111423-111433.
20. H. Quan, Y. Zhang, P. Yin and L. Zhao, *Environ. Pollut.*, 2021, **284**, 117004-117013.
21. S. Lin, M. Geng, X. Liu, J. Tan and H. Yang, *J. Appl. Phycol.*, 2016, **28**, 345-355.
22. C. Yang, J. Zhou, S. Liu, P. Fan, W. Wang and C. Xia, *J. Exp. Mar. Biol. Ecol.*, 2013, **444**, 16-23.
23. H. Bährs, A. Putschew and C. E. W. Steinberg, *Environ. Sci. Poll. Res.*, 2013, **20**, 146-154.
24. F. Yang, X. Li, Y. Li, H. Wei, G. Yu, L. Yin, G. Liang and Y. Pu, *Environ. Technol.*, 2013, **34**, 1421-1427.
25. Q. Yang, L. Chen, X. Hu, L. Zhao, P. Yin and Q. Li, *PloS One*, 2015, **10**, e0114933.
26. S. Chen, M. Haga, I. Imai, R. Sakai and M. J. Fujita, *Sci. Total Environ.*, 2023, **872**, 1-8.
27. R. Wang and M. R. Seyedsayamdost, *Org. Lett.*, 2017, **19**, 5138-5141.
28. K. E. Whalen, C. Kirby, R. M. Nicholson, M. O'Reilly, B. S. Moore and E. L. Harvey, *Sci. Rep.*, 2018, **8**, 15498-15509.
29. J. D. Park, Y. Li, K. Moon, E. J. Han, S. R. Lee and M. R. Seyedsayamdost, *Angew. Chem. Int. Ed. Engl.*, 2022, **61**, e202114022.
30. Z. Zhang, D. Li, R. Xie, R. Guo, S. Nair, H. Han, G. Zhang, Q. Zhao, L. Zhang, N. Jiao and Y. Zhang, *ISME J.*, 2023, **17**, 1979-1992.
31. M. R. Seyedsayamdost, R. J. Case, R. Kolter and J. Clardy, *Nat. Chem.*, 2011, **3**, 331-335.
32. A. Nain-Perez, L. C. Barbosa, C. R. Maltha and G. Forlani, *Tetrahedron Lett.*, 2016, **57**, 1811-1814.
33. L. Ziesche, H. Bruns, M. Dogs, L. Wolter, F. Mann, I. Wagner-Döbler, T. Brinkhoff and S. Schulz, *Chem. Bio. Chem.*, 2015, **16**, 2094-2107.
34. F. Stock, M. Syrpas, S. Graff van Creveld, S. Backx, L. Blommaert, L. Dow, W. Stock, E. Ruysbergh, B. Lepetit, B. Bailleul, K. Sabbe, N. De Kimpe, A. Willems, P. G. Kroth, A. Vardi, W. Vyverman and S. Mangelinckx, *ACS Chem. Biol.*, 2019, **14**, 198-203.
35. K. K. Schrader, F. E. Dayan, S. N. Allen, M. Q. de Regt, C. S. Tucker and R. N. Paul Jr, Jr., *Int. J. Plant Sci.*, 2000, **161**, 265-270.
36. K. K. Schrader, M. Q. de Regt, P. R. Tidwell, C. S. Tucker and S. O. Duke, *B. Environ. Contam. Tox.*, 1998, **60**, 651-658.
37. J. Yang, Q. Zhu, J. Chai, F. Xu, Y. Ding, Q. Zhu, Z. Lu, K. S. Khoo, X. Bian, S. Wang and P. L. Show, *Chin. Chem. Lett.*, 2022, **33**, 1358-1364.
38. L. Wu, H. Wu, L. Chen, S. Xie, H. Zang, R. Borriss and X. Gao, *Appl. Environ. Microbiol.*, 2014, **80**, 7512-7520.
39. X. Lu, B. Zhou, L. Xu, L. Liu, G. Wang, X. Liu and X. Tang, *Appl. Microbiol. Biotechnol.*, 2016, **100**, 5131-5139.
40. Y.-H. Li, T. Wu, W.-D. Yang, H.-Y. Li and J.-S. Liu, *Water Environ. J.*, 2014, **28**, 270-276.
41. Y. M. Liu, M. J. Chen, M. H. Wang, R. B. Jia and L. Li, *J. Microbiol. Biotechnol.*, 2013, **23**, 1304-1307.
42. K. Ozaki, A. Ohta, C. Iwata, A. Horikawa, K. Tsuji, E. Ito, Y. Ikai and K.-i. Harada, *Chemosphere*, 2008, **71**, 1531-1538.
43. F. K. Gleason and C. A. Baxa, *FEMS Microbiol. Lett.*, 1990, **68**, 77-81.
44. B. V. Gromov, A. A. Vepritskiy, N. N. Titova, K. A. Mamkayeva and O. V. Alexandrova, *J. App. Phycol.*, 1991, **3**, 55-59.
45. F. K. Gleason and J. L. Paulson, *Arc. Microbiol.*, 1984, **138**, 273-277.
46. Y. Li, H. Zhu, X. Lei, H. Zhang, C. Guan, Z. Chen, W. Zheng, H. Xu, Y. Tian, Z. Yu and T. Zheng, *J. Hazard. Mater.*, 2015, **290**, 87-95.
47. M. A. Alamsjah, S. Hirao, F. Ishibashi, T. Oda and Y. Fujita, *J. Appl. Phycol.*, 2008, **20**, 713-720.
48. V. W. Proctor, *Limnol. Oceanogr.*, 1957, **2**, 125-139.

49. J. T. Wu, Y. R. Chiang, W. Y. Huang and W. N. Jane, *Aquat. Toxicol.*, 2006, **80**, 338-345.
50. R. Wang, Y. Wang and X. Tang, *Chin. J. Ocean. Limnol.*, 2012, **30**, 778-785.
51. S. Nakai, S. Yamada and M. Hosomi, *Hydrobiologia*, 2005, **543**, 71-78.
52. I.-Z. Chiang, W.-Y. Huang and J.-T. Wu, *J. Phycol.*, 2004, **40**, 474-480.
53. N. Yamada, N. Murakami, T. Morimoto and J. Sakakibara, *Chem. Pharm. Bull.*, 1993, **41**, 1863-1865.
54. D. Li, H. Zhang, L. Fu, X. An, B. Zhang, Y. Li, Z. Chen, W. Zheng, L. Yi and T. Zheng, *PLoS One*, 2014, **9**, e91201.
55. M. A. Alamsjah, S. Hirao, F. Ishibashi and Y. Fujita, *Biosci. Biotechnol. Biochem.*, 2005, **69**, 2186-2192.
56. J. Qi, Y. Song, J. Liang, Y. Bai, C. Hu, H. Liu and J. Qu, *Sep. Purif. Technol.*, 2021, **256**, 117808-117814.
57. R. B. Volk, *J. Appl. Phycol.*, 2006, **18**, 145-151.
58. S. A. Alamri and Z. A. Mohamed, *Saudi J. Biol. Sci.*, 2013, **20**, 357-363.
59. Y. S. Kim, H.-J. Son and S.-Y. Jeong, *J. Microbiol.*, 2015, **53**, 511-517.
60. J. F. Blom, T. Brütsch, D. Barbaras, Y. Bethuel, H. H. Locher, C. Hubschwerlen and K. Gademann, *Org. Lett.*, 2006, **8**, 737-740.
61. B. H. Zhang, Z. G. Ding, H. Q. Li, X. Z. Mou, Y. Q. Zhang, J. Y. Yang, E. M. Zhou and W. J. Li, *Appl. Environ. Microbiol.*, 2016, **82**, 5132-5143.
62. N. Murakami, H. Imamura, J. Sakakibara and N. Yamada, *Chem. Pharm. Bull.*, 1990, **38**, 3497-3499.
63. N. Murakami, T. Morimoto, H. Imamura, T. Ueda, S. Nagai, J. Sakakibara and N. Yamada, *Chem. Pharm. Bull.*, 1991, **39**, 2277-2281.
64. L. Hagmann and F. Jüttner, *Tetrahedron Lett.*, 1996, **37**, 6539-6542.
65. N. Thanh Doan, R. W. Rickards, J. M. Rothschild and G. D. Smith, *J. Appl. Phycol.*, 2000, **12**, 409-416.
66. J. Y. Cho, *Biosci. Biotechnol. Biochem.*, 2012, **76**, 1452-1458.
67. L. Dow, F. Stock, A. Peltekis, D. Szamosvári, M. Prothiwa, A. Lapointe, T. Böttcher, B. Bailleul, W. Vyverman, P. G. Kroth and B. Lepetit, *Chem. Bio. Chem.*, 2020, **21**, 1206-1216.
68. E. L. Harvey, R. W. Deering, D. C. Rowley, A. El Gamal, M. Schorn, B. S. Moore, M. D. Johnson, T. J. Mincer and K. E. Whalen, *Front. Microbiol.*, 2016, **7**, 1-12.
69. Y.-L. Yi, X.-B. Yu, C. Zhang and G.-X. Wang, *Res. Microbiol.*, 2015, **166**, 93-101.
70. X. An, B. Zhang, H. Zhang, Y. Li, W. Zheng, Z. Yu, L. Fu and T. Zheng, *Front. Microbiol.*, 2015, **6**, 1-14.
71. K. Ishida and M. Murakami, *J. Org. Chem.*, 2000, **65**, 5898-5900.
72. Y. Yamamoto, T. Kouchiwa, Y. Hodoki, K. Hotta, H. Uchida and K.-I. Harada, *J. Appl. Phycol.*, 1998, **10**, 391-397.
73. K. Kaya and T. Sano, *Phycologia*, 1996, **35**, 117-119.
74. D. P. Singh, M. B. Tyagi, A. Kumar, J. K. Thakur and A. Kumar, *W. J. Microbiol. Biotechnol.*, 2001, **17**, 15-22.
75. S.-Y. Jeong and H.-J. Son, *J. Microbiol.*, 2021, **59**, 389-400.
76. Y. Feng, X. Chang, L. Zhao, X. Li, W. Li and Y. Jiang, *Ecol. Eng.*, 2013, **53**, 306-312.
77. X. Zheng, B. Zhang, J. Zhang, L. Huang, J. Lin, X. Li, Y. Zhou, H. Wang, X. Yang, J. Su, Y. Tian and T. Zheng, *Appl. Microbiol. Biotechnol.*, 2013, **97**, 9207-9215.
78. K. Hirata, S. Yoshitomi, S. Dwi, O. Iwabe, A. Mahakhant, J. Polchai and K. Miyamoto, *J. Biosci. Bioeng.*, 2003, **95**, 512-517.

79. B.-H. Zhang, W. Chen, H.-Q. Li, E.-M. Zhou, W.-Y. Hu, Y.-Q. Duan, O. A. Mohamad, R. Gao and W.-J. Li, *App. Microbiol. Biotechnol.*, 2015, **99**, 7673-7683.
80. A. Todorova and F. Jüttner, *Phycologia*, 1996, **35**, 183-188.
81. J. P. Berry, M. Gantar, R. E. Gawley, M. Wang and K. S. Rein, *Comp. Biochem. Physiol. C Toxicol. Pharmacol.*, 2004, **139**, 231-238.
82. P. N. Leão, A. R. Pereira, W.-T. Liu, J. Ng, P. A. Pevzner, P. C. Dorrestein, G. M. König, V. M. Vasconcelos and W. H. Gerwick, *Proc. Nat. Acad. Sci. U. S. A.*, 2010, **107**, 11183-11188.
83. J. I. Toohey, C. D. Nelson and G. Krotkov, *Canad. J. Bot.*, 1965, **43**, 1151-1155.
84. G. Weiss, D. Kovalerchick, J. Lieman-Hurwitz, O. Murik, R. De Philippis, S. Carmeli, A. Sukenik and A. Kaplan, *Environ. Microbiol.*, 2019, **21**, 1140-1150.
85. M. H. Wang, P. Peng, Y. M. Liu, R. B. Jia and L. Li, *J. Microbiol. Biotechnol.*, 2013, **23**, 260-266.
86. Y. Chen, G. Luo, S. Chen, D. Zhang, W. Xie, Z. Wang, W. Zheng and H. Xu, *Ecotoxicol. Environ. Saf.*, 2021, **228**, 1-13.
87. S. Nakai, Y. Inoue and M. Hosomi, *Water Res.*, 2001, **35**, 1855-1859.
88. Z. Y. Lu, B. Y. Liu, Y. He, Z. L. Chen, Q. H. Zhou and Z. B. Wu, *Allelopathy J.*, 2014, **34**, 195-205.
89. M.-H. Wang, P. Peng, Y.-M. Liu, R.-B. Jia and L. Li, *J. Microbiol. Biotechnol.*, 2013, **23**, 260-266.
90. X. Wang, L. Gong, S. Liang, X. Han, C. Zhu and Y. Li, *Harmful Algae*, 2005, **4**, 433-443.