

Table 1. *Isochrysis galbana*. Composition of main culture in terms of culture volume. Data for ammonium and intracellular amino acids (InAA) are given in terms of nitrogen. Extracted chlorophylls were measured by fluorometry (fl) or spectrophotometry (sp).

–: data missing due to instrument malfunction or, for spectrophotometric pigment analysis (sp), because the excessive volumes of culture required for first half of the experiment meant that samples were not taken

Time (d)	Cells (10 ⁶ ml ⁻¹)	Biovolume (nl ml ⁻¹)	Ammonium (µg N ml ⁻¹)	Cell C (µg C ml ⁻¹)	Cell N (µg N ml ⁻¹)	InAA (ng N ml ⁻¹)	Chlorophyll (ng nl ⁻¹)			Carotenoid (mg N nl ⁻¹)
							a (fl)	a (sp)	c (sp)	
0.0	0.04	2.0	1.411	0.60	0.03	0.48	4	4	1	13
0.5	0.04	2.2	1.400	0.61	0.08	0.86	3	–	–	–
1.0	0.04	2.1	1.383	0.58	0.08	0.72	3	–	–	–
1.5	0.04	2.1	1.355	–	0.12	1.02	3	–	–	–
2.0	0.04	2.1	1.355	0.68	0.12	1.13	3	–	–	–
2.5	0.05	2.6	1.350	0.66	–	1.25	4	–	–	–
3.0	0.05	–	1.355	0.75	–	1.93	6	–	–	–
3.5	0.05	2.5	1.333	2.29	0.38	2.27	9	–	–	–
4.0	0.04	2.1	1.316	2.91	0.92	2.29	9	–	–	–
4.5	0.06	2.9	1.288	1.75	0.61	2.49	14	–	–	–
5.0	0.05	2.3	1.288	1.49	0.26	2.77	14	–	–	–
5.5	0.05	3.1	1.260	2.14	0.27	3.90	17	–	–	–
6.0	0.10	4.4	1.257	1.58	0.64	4.14	18	–	–	–
6.5	0.10	5.8	1.226	2.07	0.36	5.07	41	–	–	–
7.0	0.15	7.4	1.226	2.04	0.36	5.40	41	–	–	–
7.5	0.15	9.5	1.092	2.66	0.45	7.81	50	53	52	35
8.0	0.23	9.8	1.092	2.25	0.52	8.14	53	67	70	54
8.5	0.22	13.4	0.935	4.12	0.57	11.67	68	78	43	75
9.0	0.28	13.9	0.932	3.93	0.64	11.12	84	–	–	–
9.5	0.29	18.6	0.806	5.03	0.72	15.76	133	148	46	134
10.0	0.45	18.9	0.795	4.42	0.60	16.14	133	152	55	134
10.5	0.46	31.3	0.577	6.06	0.74	24.39	178	205	75	192
11.0	0.66	28.1	0.566	5.69	0.79	23.16	210	227	80	201
11.5	0.66	41.0	0.274	8.42	1.01	32.66	255	283	104	240
12.0	0.89	38.6	0.291	8.46	1.29	34.13	255	290	115	243
12.5	0.89	54.8	0	11.29	1.37	41.36	323	376	129	320
13.0	1.11	51.6	0	11.51	1.56	39.02	336	410	152	369
13.5	1.13	59.8	0	13.83	1.53	32.42	377	434	160	408
14.0	1.33	62.2	0	13.91	1.61	34.73	399	385	148	387
14.5	1.33	67.8	0	15.95	1.52	32.07	377	468	164	486
15.0	1.47	70.1	0	15.06	1.53	33.43	413	493	181	533
15.5	1.50	76.2	0	20.03	1.60	36.44	440	518	206	597
16.0	1.50	76.5	0	16.40	1.43	35.46	395	478	167	557
16.5	1.64	85.2	0	18.74	1.44	39.91	439	515	195	644
17.0	1.82	93.3	0	18.03	1.54	34.12	399	468	136	594
18.0	1.98	87.9	0	–	–	–	–	–	–	–
18.5	2.00	105.2	0	23.20	1.59	34.83	395	481	164	693
19.0	1.93	106.4	0	22.02	1.32	41.05	386	441	151	657
20.0	1.95	–	0	–	–	–	–	–	–	–
20.5	1.99	101.1	0	23.69	1.30	31.72	377	442	146	674
21.0	1.93	93.4	0	23.66	1.31	30.11	368	439	144	693
21.5	1.95	–	0	–	–	–	–	–	–	–
22.0	2.00	90.3	0	25.80	1.31	30.10	368	415	156	717
23.0	2.00	85.8	0	27.49	1.46	34.24	296	476	153	815
23.5	2.00	90.4	0	25.58	1.38	29.62	268	375	119	645
24.0	1.94	84.2	0	25.53	1.38	27.20	341	407	142	753
24.5	1.90	86.7	0	27.05	1.44	30.83	341	407	150	792
25.0	1.99	90.8	0	26.02	1.36	31.36	323	375	126	731

into 5-litre and 3-litre flasks. Cultures were grown at 18°C, illuminated at 100 µmol m⁻² s⁻¹, with a 12 h light : 12 h dark cycle, and occasional shaking. No aeration was provided. Samples were withdrawn aseptically through a syphon tube with the inlet near to the bottom of the flask.

The main culture (initially of 5 litres) was inoculated by the aseptic addition of stationary-phase culture grown on the same medium under the same conditions to give an addition of 3% (v : v inoculum : medium). This culture was sampled at least every 12 h (30 min before the end of the light or dark phase), and more fre-

quently following refeeding during the light (Day 0), for a 24 h period during the exponential phase of growth (Day 9), and whilst entering the stationary phase (Day 15). At the end of the stationary phase (Day 24), a portion of the culture was used to inoculate 2 litres of fresh medium, and the response to refeeding a stationary-phase culture in darkness was examined.

An additional 2-litre volume was also inoculated at Day 0, again with a 3% inoculum from the same initial culture. This culture was sampled occasionally until it had just exhausted the nitrogen source, at which time portions were taken and used to inoculate fresh