

Table S1. Morphological characteristics of cyanobacterial isolates and their exopolysaccharide yield.

Isolate code	Source of isolation	Culture color	General shape	Vegetative cell	Heterocyst		Sheath	Genus name	Exo-polysaccharide yield	
					Shape	Site			BPS	RPS
Mab 1	Cultivated soil	Bright blue-green	Filamentous	Long cylindrical with a	-	-	-	<i>Pseudoanabena</i> sp.	0.45 (43%)*	-
Mab 2	Moist soil from rice field	Brown	Filamentous	spherical	spherical	Inter. & Ter.	-	<i>Nostoc</i> sp.	0.72 (75%)*	-
Mab 3	Non-cultivated	Olive green	Filamentous	Disc-shape	-	-	Thin	<i>Oscillatoria</i> sp.	0.0352 (16%)*	-
Mab 4	Agriculture wastewater	Light blue-green	Unicellular	Spherical	-	-	-	<i>Microcystis</i> sp.	0.533 (65%)*	-
Mab 5	Cultivated soil	Pale green	Filamentous	Disc-shape	-	-	Very thin	<i>Oscillatoria</i> sp.	0.031 (15%)*	-
Mab 6	Cultivated	Orange	Unicellular	Tetrad	-	-	-	<i>Tetraedron</i> sp.		1.01 (93%)*
Mab 7	Tap water	Light blue-green	Unicellular	Spherical	-	-	-	<i>Microcystis</i> sp.	0.445 (63%)*	-

Mab 8	Agriculture wastewater	Olive green	Unicellular	Spherical	-	-	-	<i>Chlorella</i> sp.	-	0.32 (20%)*
Mab 9	Cultivated	Brown	Filamentous	Spherical	Spherical	Inter.	-	<i>Nostoc</i> sp.	0.52	-
Mab 10	Sea water	Blue-	Coiled	Disc-shape	-	-	-	<i>Spirulina</i> sp.	0.79	-
Mab 11	Non-	Blue-	Filamentous	Cylindrical	Spherical	Inter.	-	<i>Anabaena</i> sp.	0.33	-
Mab 12	Drainage	Pale	Filamentous	Elongated	-	-	-	<i>Limnothrix</i> sp.	0.41	-
Mab 13	Irrigation canal	Blue-green	Filamentous	Cylindrical			Fine	<i>Phormidium</i> sp.	0.25 (12.7%)*	-
Mab 14	Agriculture wastewater	Blue-green	Filamentous	Spherical	Spherical	Inter. & Ter.	-	<i>Anabaena</i> sp.	0.034 (11.2%)*	-
Mab 15	Moist soil	Dark green	Filamentous	Disc- shape	-	-	Thick	<i>Lyngbya</i> sp.	0.23 (14.33%)*	-
Mab 16	Tap water	Blue-	Unicellular	Spherical	-	-	-	<i>Synechocystis</i>	-	0.65 (92%)*
Mab 17	Cultivated soil	Bright blue-green	Filamentous	Long cylindrical with a rounded end	-	-	-	<i>Pesudoanabena</i> sp.	0.52 (40.3%)*	-

Mab 18	Sewage water	Dark green	Unicellular	Spherical	-	-	-	<i>Chlorella</i> sp.	-	0.32 (19.5%)*
Mab 19	Tap water	Blue-green	Unicellular	Spherical	-	-	-	<i>Microcystis</i> sp.	0.45 (54.5%)*	-
Mab 20	Nile river	Blue-green	Unicellular	Spherical			-	<i>Synechocystis</i> sp.		1.2 (93.2%)*
Mab 21	Moist soil	Blue-green	Filamentous	Short cylindrical	-	-	Fine	<i>Phormidium</i> sp.	0.22 (11.5%)*	-
Mab 22	Irrigation channels	Blue-green	Unicellular	Spherical	-	-	Present	<i>Synechococcus</i> sp.		0.91 (88%)*
Mab 23	Sandy soil	Blue-	Filamentous	Disc- shape	-	-	Very	<i>Oscillatoria</i> sp.	0.35	-
Mab 24	Sea water	Blue-	Filamentous	Barrel	Ovoid	Inter.	-	<i>Nostoc</i> sp.	0.66	-
Mab 25	Cultivated	Dark	Filamentous	Disc- shape	-	-	Thick	<i>Lyngbya</i> sp.	0.33	-

(*) indicates the polysaccharide yield as a percentage of initial cyanobacterial biomass.

Table S2. Plackett–Burman experimental design under SF fermentation for cyanobacterial alginate production.

St d	Ru n	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	Total polysaccharide yield (mg/ml)		Residua ls
																					Actua l	Predict ed	
9	1	1	-1	-1	-1	-1	1	1	-1	1	1	-1	-1	1	1	1	1	-1	1	-1	9.55477	9.51	0.0464
13	2	1	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	1	1	-1	-1	1	1	1	7.0592	7.02	0.0427
20	3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	6.93059	6.88	0.0464
10	4	-1	1	-1	-1	-1	-1	1	1	-1	1	1	-1	-1	1	1	1	1	-1	1	10.0017	9.96	0.0427
5	5	-1	1	1	-1	1	1	-1	-1	1	1	1	1	-1	1	-1	1	-1	-1	-1	3.70862	3.70	0.0096

18	6	-1	-1	1	1	1	1	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	1	1	4.817 82	4.83	-0.0096
16	7	1	1	1	1	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	1	1	-1	-1	11.13 97	11.15	-0.0058
7	8	-1	-1	-1	1	1	-1	1	1	-1	-1	1	1	1	1	-1	1	-1	1	-1	7.422 3	7.46	-0.0427
15	9	1	1	1	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	1	1	-1	-1	1	7.371 84	7.37	0.0058
1	10	1	1	-1	-1	1	1	1	1	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	8.116 67	8.11	0.0096
2	11	-1	1	1	-1	-1	1	1	1	1	-1	1	-1	1	-1	-1	-1	-1	1	1	5.139 66	5.10	0.0427
19	12	1	-1	-1	1	1	1	1	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	1	3.099 43	3.11	-0.0096
8	13	-1	-1	-1	-1	1	1	-1	1	1	-1	-1	1	1	1	1	-1	1	-1	1	10.81 78	10.81	0.0058

6	14	-1	-1	1	1	-1	1	1	-1	-1	1	1	1	1	-1	1	-1	1	-1	-1	4.777 59	4.82	-0.0427
4	15	1	1	-1	1	1	-1	-1	1	1	1	1	-1	1	-1	1	-1	-1	-1	-1	7.306 32	7.31	-0.0058
17	16	-1	1	1	1	1	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	1	1	-1	9.501 72	9.51	-0.0058
3	17	1	-1	1	1	-1	-1	1	1	1	1	-1	1	-1	1	-1	-1	-1	-1	1	8.138 51	8.18	-0.0464
12	18	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	1	1	-1	-1	1	1	1	1	12.52 45	12.57	-0.0464
11	19	1	-1	1	-1	-1	-1	-1	1	1	-1	1	1	-1	-1	1	1	1	1	-1	5.927 01	5.92	0.0096
14	20	1	1	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	1	1	-1	-1	1	1	5.377 59	5.42	-0.0464
Variable level		g/L	g/L	g/L	g/L	g/L	g/L	g/L	g/L	mL	g/L	(°C)	(pH)	mL	%	rpm	days	days	-	-			

-1	0.7	0.5	0.0 2	0.0 4	0.01 6	0.00 3	0.00 3	0.000 5	0.5	0	25	7	40 0	3	0	7	20					
1	3.4	3	0.0 6	0.1	0.05 6	0.00 9	0.00 9	0.001	1.5	10	33	10	60 0	6	12 0	20	30					