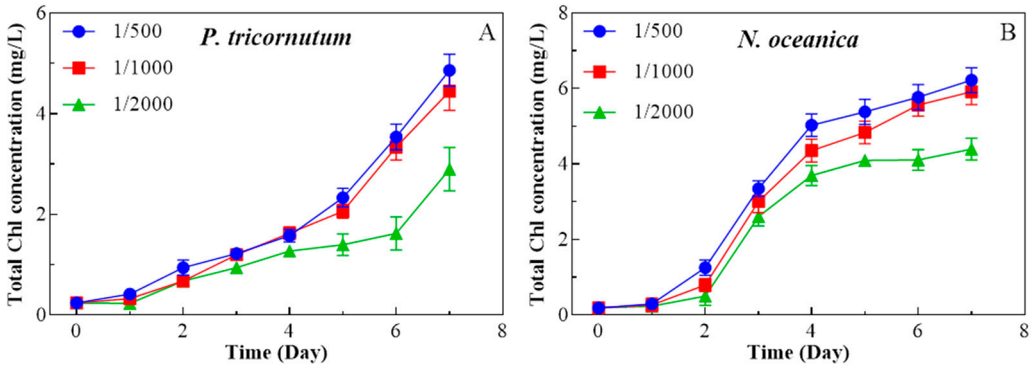

Figure S1. The changes in total chlorophyll of (A) *P. tricornutum* and (B) *N. oceanica*, cultured in seawater supplemented with different levels of MSGR. Values are expressed as means ± s.d. (n = 3)

Table S1. The nutritional assimilation of the two microalgae, *P. tricornutum* and *N. oceanica*, grown in EM and in S-MSGR.

Algae species	Medium	Initial concentration (mg/L)		Assimilation efficiency (%)		Average yield coefficient (mg/g)	
		TN	TP	AE_N	AE_P	N-*AYC*	P-*AYC*
P. tricornutum	EM	43.19	2.092	50.7	98.9	32.9	3.11
	S-MSGR	179.4	5.560	38.9	97.8	74.8	5.83
N. oceanica	EM	43.19	2.092	25.0	97.5	22.4	10.5
	S-MSGR	179.4	5.560	34.8	66.9	174.8	10.4

Table S2. Comparison of the biomass and lipid production performances of *P. tricornutum* cultured in S-MSGR with other results reported in the literature.

Alga	Medium	Conditions	Biomass		Lipid		Ref.
			Yield (g/L)	Productivity (mg/L/day)	Content (%)	Productivity (mg/L/day)	
FACHB-863	EM S-MSGR	T: 25 °C Illumination: 45 μmol/m^2/s continuous illumination Time: 12 days	0.66 0.93	55 77.5	25.3 29.5	14.0 22.9	This paper
P. tricornutum	f/2 + $NaNO_3$ + 0 mg/L + 16.45 mg/L + 32.09 mg/L + 64.29 mg/L	T: 20 °C Illumination: 80–100 μmol/m^2/s 14:10 (light:dark cycle) Time: 21 days	0.07 0.17 0.20 0.23	3.33 8.10 9.52 10.95	53 23 9.6 2.8	1.77 0.90 1.86 0.30	[29]
UTEX 466	f/2 + DMW (dairy manure wastewater) 0%, 10%, 30%, 60%	T: 23 °C Illumination: 60–120 μmol/m^2/s 16:8 (light:dark cycle) Time: 15 days	0.31 0.20 0.57 0.77	20.7 13.3 38.0 51.3	15 36 10 3.4	3.1 4.8 3.8 1.7	[30]

P. tricornutum	f/2 +0, 0.5, 1, 2, 5 g/L glucose Sodium acetate Starch	T: 20 °C Illumination: 165 μmol/m^2/s continuous illumination Time: 10 days	0.66–1.16 0.6–0.89	66–116 60–89	18–50 About 20	18–50 10–20	[31]
PTN0301	Modified f/2 + waste products from anaerobic digestion + CO_2/air	T: 20 °C Illumination: 90–110 μmol/m^2/s 16:8 (light:dark cycle) Time: 17 days Aeration: 0.6 L CO_2/L/day	1.0	58.8	38	22.4	[32]
CCMP632	f/2 Municipal wastewater (MW) MW: seawater=1:2 MW: seawater=1:1 MW: seawater=2:1	T: 18 °C Illumination: 120 μmol/m^2/s 12:12 (light:dark cycle) Time: 10 days	0.31 0.35 0.40 0.42 0.25	31 35 40 42 25	20 15 15 15 16	5.3 4.5 5.5 5.5 3.5	[33]

SAG1090-1	f/2 + ultrafiltered digestate (UF) + 0.02 mol/L glycerol (Gly)	T: 25 °C Illumination: 312 µmol/m^2/s 12:12 (light:dark cycle) Time: 17 days Aeration: 10 L/min	3.11 3.25 3.40	183 191 200	27 27 27	49 51 54	[34]
P. tricornutum	f/2	T: 30 °C Illumination: – Time: 10 days Aeration: 1% CO_2	0.41	41	32	13.3	[40]
P. tricornutum	f/2+18 µmol/m^2/s f/2+36 µmol/m^2/s f/2+72 µmol/m^2/s	T: 22 °C Illumination: 18/36/72 µmol/m^2/s 12:12 (light:dark cycle) Time: 9 days	0.186 0.324 0.464	20.7 36.0 51.6	9.20 15.9 29.5	1.9 5.7 20	[41]
CCAP 1055/1	Liquid medium (LM) LM + 1% glucose LM + 1% glycine	T: 18 °C Illumination: 75 µmol/m^2/s 16:8 (light:dark cycle) Time: 10 days Rotary shaker: 130 rpm	1.0 1.0 1.2	100 100 120	28 28 25	28 28 30	[42]

FACHB-863	f/2-Si f/2-Si + 2.5 mg/L 2,4-D (2,4-dichlorophenoxyacetic acid)	T: 21 °C Illumination: 150 μmol/m^2/s 12:12 (light:dark cycle) Time: 8 days	0.58 1.2	72.5 100	22 62	16 62	[43]
SCSIO140, 771, 431, 433, 766, 828	f/2 + 18.76 mg/L sodium metasilicate	T: 25 °C Illumination: 40 μmol/m^2/s continuous illumination Time: 11 days	0.25–0.36	22.7–32.7	16–31	6.81–7.16	[44]
CCAP 1055/1	f/2 + Ammonium f/2 + Ammonium with tungstate	T: 25 °C Illumination: 1000 μmol/m^2/s continuous illumination Time: 7 days	-	-	-	8–16	[45]
Bohlin	f/2	T: 23 °C Illumination: 200 μmol/m^2/s 16:8 (light:dark cycle) Time: 14 days Aeration: 120 L/min	0.96	68.6	9.1	6.24	[46]

-: data are not mentioned.

Table S3. Comparison of the biomass and lipid production performances of *N. oceanica* cultured in S-MSGR with other results from the literature.

Alga	Medium	Conditions	Biomass		Lipid		Ref.
			Yield (g/L)	Productivity (mg/L/day)	Content (%)	Productivity (mg/L/day)	
FACHB-926	EM S-MSGR	T: 25 °C Illumination: 45 μmol/m^2/s continuous illumination Time: 12 days	0.19 0.36	15.8 30.0	27.5 30.6	4.5 9.1	This paper
MK158312	f/2	T: 25 °C Illumination: 70 μmol/m^2/s 12:12 (light:dark cycle) Time: 12 days	0.36	30	38	11.4	[35]
CCNM 1032	Conway medium	T: 25 °C Illumination: 60 and 150 μmol/m^2/s 12:12 (light:dark cycle) 40 μmol/m^2/s different photoperiod regimes Time:18 days	0.68–0.81	38–45	13–33	5–15	[36]

CCMP 525	f/2 + 0, 150mg/L $NaNO_3$	T: 21 °C Illumination: 50 μmol/m^2/s 250 μmol/m^2/s continuous illumination Time:12 days	0.5–0.7	41.7–58.3	25.7–26.4	11–15	[37]
CCALA 804	mBG-11+170 μmol/m^2/s mBG-11+350 μmol/m^2/s mBG-11+700 μmol/m^2/s	T: 25 ℃ Illumination: 170 μmol/m^2/s 350 μmol/m^2/s 700 μmol/m^2/s Time:7 days Aeration: 2% CO_2	5	-	-	80 100 180	[38]
CCMP1779	f/2 + polyethylene glycol 200 (PEG 200)	T: 25 °C Illumination: 125.9 μmol/m^2/s continuous illumination Time:7 days Aeration: 30 mL/min CO_2:N_2 = 15:85, v/v	1.2–1.3	171–185	32.5–37.5	54.6–61.4	[39]
CCAP 849/10	f/2 + Ammonium Ammonium with tungstate	T: 25 °C Illumination: 16:8 1000 μmol/m^2/s 16:8 (light:dark cycle) Time: 7 days	-	-	-	14–16	[45]

DUT01	f/2 + 37.5, 75, 300 mg/L $NaNO_3$ BG11 + 37.5, 75, 300 mg/L $NaNO_3$	T: 25 °C Illumination: 60 μmol/m^2/s 14:10 (light:dark cycle) Time: 12 days Aeration: 2% CO_2, 0.2 m^3/min	0.2–0.6 0.7–1.3	16.7–50 58.3–108	10–30 10–30	10–15 18–30	[47]
CCMP1779	F/2 +1.04g/day $NaHCO_3$	T: 25 ℃ Illumination: 85 μmol/m^2/s Time:9 day Aeration: 4 mL/min, 15% CO_2	1-1.5	-	-	-	[48]
N. oceanica	Conway medium + 0, 2.5, 5, 10, 15, 25, 30, 40 g/L glucose	T: 25 °C Illumination: 60 μmol/m^2/s 12:12 (light:dark cycle) Time: 15 days	0.6–1.0	40–67	25–40	12–24	[49]
CCAP 849/10	f/2 + 0.1, 1, 2.5, 5, 10 ppm IAA (3-indoleacetic acid)	T: 25 °C Illumination: 100 μmol/m^2/s 12:12 (light:dark cycle) Time: 12 days	0.12–0.38	10–31.9	10–30	1.5–5.5	[50]

SCS-1981	0.5 g/L $NaNO_3$, 20 mg/L NaH_2PO_4, 5.0 mg /L $FeSO_4 \cdot 7H_2O$, 1.0 g/L $NaHCO_3$ Salinity 28‰	Open pond system	0.55		15–20	5.68	[51]
CCMP1779	f/2 +0.5g/L $NaHCO_3$	T: 20 ℃ Illumination: 100 μmol/m^2/s Time:12 day Rotary shaker 120 rpm	0.2	-	-	-	[52]
N. oceanica	f/2	T: 20 °C Illumination: 100 μmol/m^2/s 12:12 (light:dark cycle) different LED colours Time:13 days Aeration: 2.5 L/min	0.4–0.6	30.8–46.2	24–45	7–20.7	[53]
CCAP 849/10	f/2 f/2 + 1.0 mg/L sodium bicarbonate	T: 16 °C Illumination: 200 μmol/m^2/s 12:12 (light:dark cycle) Aeration: 2.5 L/min	-	-	20	1.5	[54]

-: data are not mentioned.