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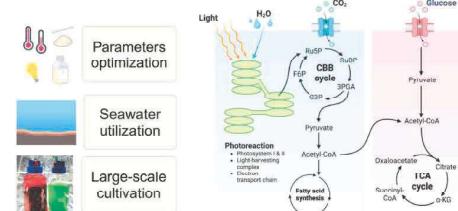
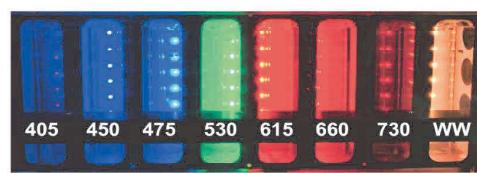
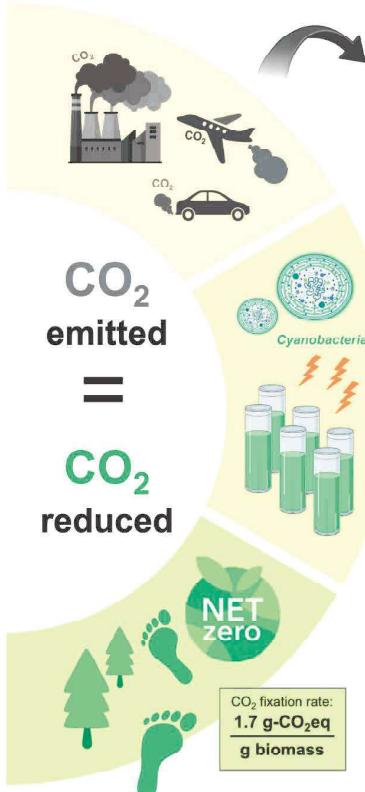
Cyanobacteria for direct air capture: Growth modulation and carbon fixation in marine environment

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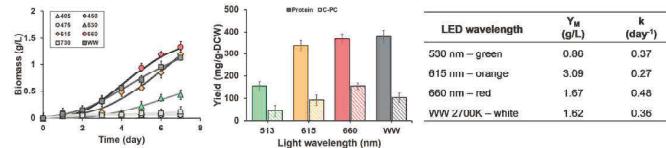
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Growth profile under various LED wavelengths

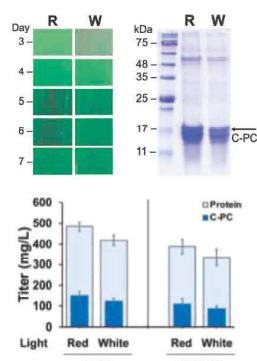
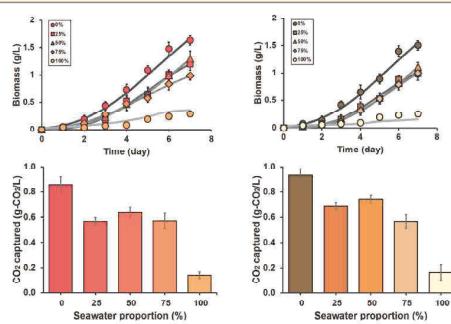


Red light (660 nm) and white light (WW 2700K) promoted growth and protein accumulation.

Simultaneous optimization of cultivation parameters

Light (h)	Dark (h)	Nitrogen (mM)	Temp. (°C)	Biomass (g/L)	Protein (%)	C-PC (%)
24	0	2	25	1.11	23.43	8.24
16	8	2	25	1.32	25.58	9.85
12	12	2	25	1.29	24.21	8.52
24	0	6	25	1.20	30.70	14.60
16	8	6	25	1.52	37.68	19.26
12	12	6	25	1.23	35.54	17.87
24	0	2	42	1.21	27.43	6.21
16	8	2	42	1.13	25.55	6.89
12	12	2	42	1.11	20.33	5.24
24	0	6	42	1.26	29.13	7.83
16	8	6	42	1.12	28.71	5.39
12	12	6	42	0.99	20.19	5.44

Cultivation using marine seawater from Penghu, Taiwan



Take-home messages

- C. aponinum* PCC10605 can thrive in elevated salinity and simultaneously accumulate phycocyanin (C-PC).
- Artificial red and white light sources was found to enhance growth, and further supported by optimized cultivation parameters.
- Marine seawater is a feasible water source for cyanobacteria cultivation.
- Future research should focus on elucidating the interplay of biomass accumulation under red light and exploring light regime optimization for further yield improvements.

- Similar trend of biomass under red and white light.
- C. aponinum* cultivation in marine environment relied on metal trace element addition to support growth.
- C. aponinum* was able to thrive in actual marine environment containing up to 75% seawater.
- 50% seawater content showed better CO2 uptake capacity.

