

1 **Supplementary Material for "Predicting the metabolic capabilities of *S. elongatus* PCC 7942 adapted to different**
 2 **light regimes"**

3 Authors: Jared T. Broddrick, David G. Welkie, Denis Jallet, Susan S. Golden, Graham Peers and Bernhard O. Palsson

4 The following Supporting Information is available for this article:

5 Modeling files can be found at <http://systemsbiology.ucsd.edu/Downloads/SupplementalData>

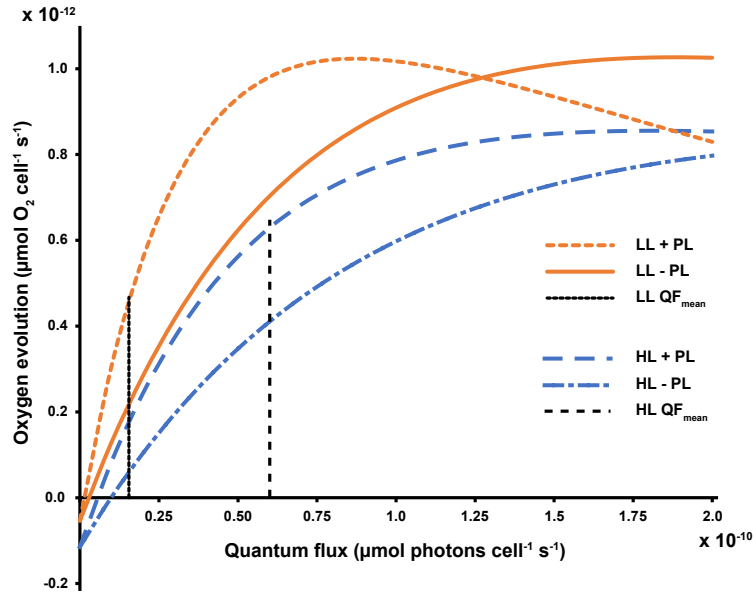


Fig. S1. Effect of path length correction on quantum flux calculations *S. elongatus*. Accounting for cell shading in the determination of quantum flux affects the calculated oxygen evolution rate at the experimental conditions. +/- PL refers to plots with (+) or without (-) accounting for path length. Abbreviations. LL: low light, HL: high light, PL: path length, QF: quantum flux.

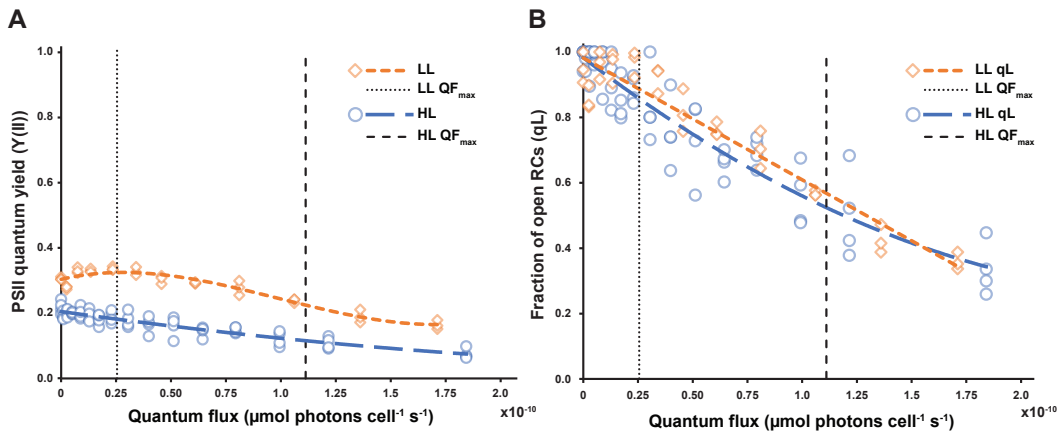


Fig. S2. Chlorophyll fluorescence parameters versus quantum flux for *S. elongatus*. (A) Quantum yield of photosystem II (PSII) versus QF curves. The maximal quantum yield (F_v/F_m) is equal to the y-intercept of the curves. (B) Fraction of open reaction centers (RCs) versus quantum flux. Vertical dashed lines represent the maximum quantum flux received by the cultures at the experimental irradiance. Abbreviations. LL: low light, HL: high light, QF: quantum flux.

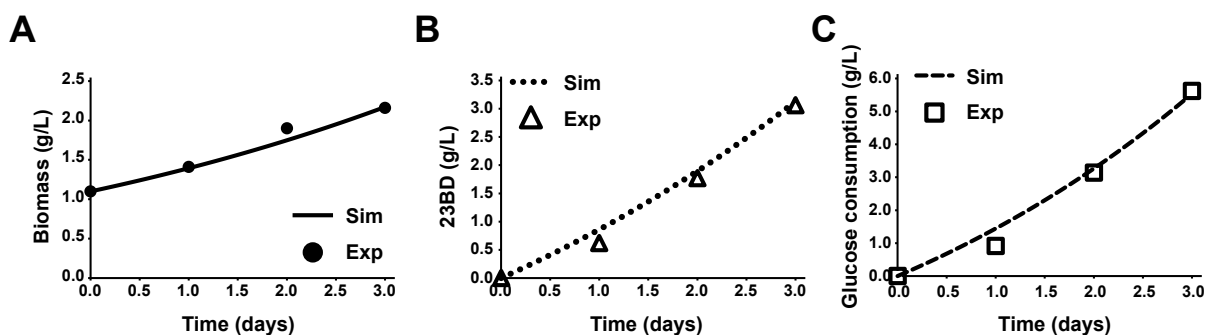


Fig. S3. In silico recapitulation of an *S. elongatus* strain designed for 2,3-butanediol production. (A) Biomass, (B) 2,3-butanediol (23BD) production and (C) glucose consumption over the first 3 days of culturing. Experimental data points (Exp) were taken from published values (1). Simulations were set with the biomass production at 20% of the maximum and a glucose uptake rate of $0.27 \text{ mmol glc gDW}^{-1} \text{ h}^{-1}$

Table S1. Content edits to *iJB785* in the construction of *iJB792*.

Reaction ID	Reaction name	Notes
MPTSS	Molybdopterin synthase sulfurylase	Added. Molybdopterin cofactor biosynthesis.
MOADSUX	MoaD sulfuration (nadh, assumed)	Added. Molybdopterin cofactor biosynthesis.
GTPC	GTP 3,8-cyclase	Added. Molybdopterin cofactor biosynthesis.
CPMPS	Cyclic pyranopterin monophosphate synthase	Added. Molybdopterin cofactor biosynthesis.
MPTS	Molybdopterin synthase	Added. Molybdopterin cofactor biosynthesis.
MPTAT	Molybdopterin adenylyltransferase	Added. Molybdopterin cofactor biosynthesis.
MOCOS	Molybdenum cofactor synthase	Added. Molybdopterin cofactor biosynthesis.
MDH	Malate dehydrogenase	Added. Based on fluxomics data (2). Gene reaction rule unknown.
ORNNTA	Ornithine transaminase	Deleted. Gene model results in a truncated protein that appears to be inactive in vivo (3)

- 6 1. Kanno M, Carroll AL, Atsumi S (2017) Global metabolic rewiring for improved CO₂ fixation and chemical production in cyanobacteria. *Nature Communications* 8:14724.
- 7 2. Jazmin LJ, et al. (2017) Isotopically nonstationary ¹³C flux analysis of cyanobacterial isobutyraldehyde production. *Metabolic engineering* 42:9–18.
- 8 3. Broddrick JT, et al. (2016) Unique attributes of cyanobacterial metabolism revealed by improved genome-scale metabolic modeling and essential gene analysis. *Proceedings of the National Academy of Sciences* 113(51):E8344–E8353.
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