

Electronic Supplementary Information (ESI)

Towards High-Throughput Optimization of Microbial Lipid Production: From Strain Development to Process Monitoring

Dania Awad, ‡^a Samer Younes, ‡^a Matthias Glemser, ^a Gerhard Schenk, ^{b,c} Norbert Mehlmer, ^a and Thomas Brueck ^a

Sustainable Energy & Fuels

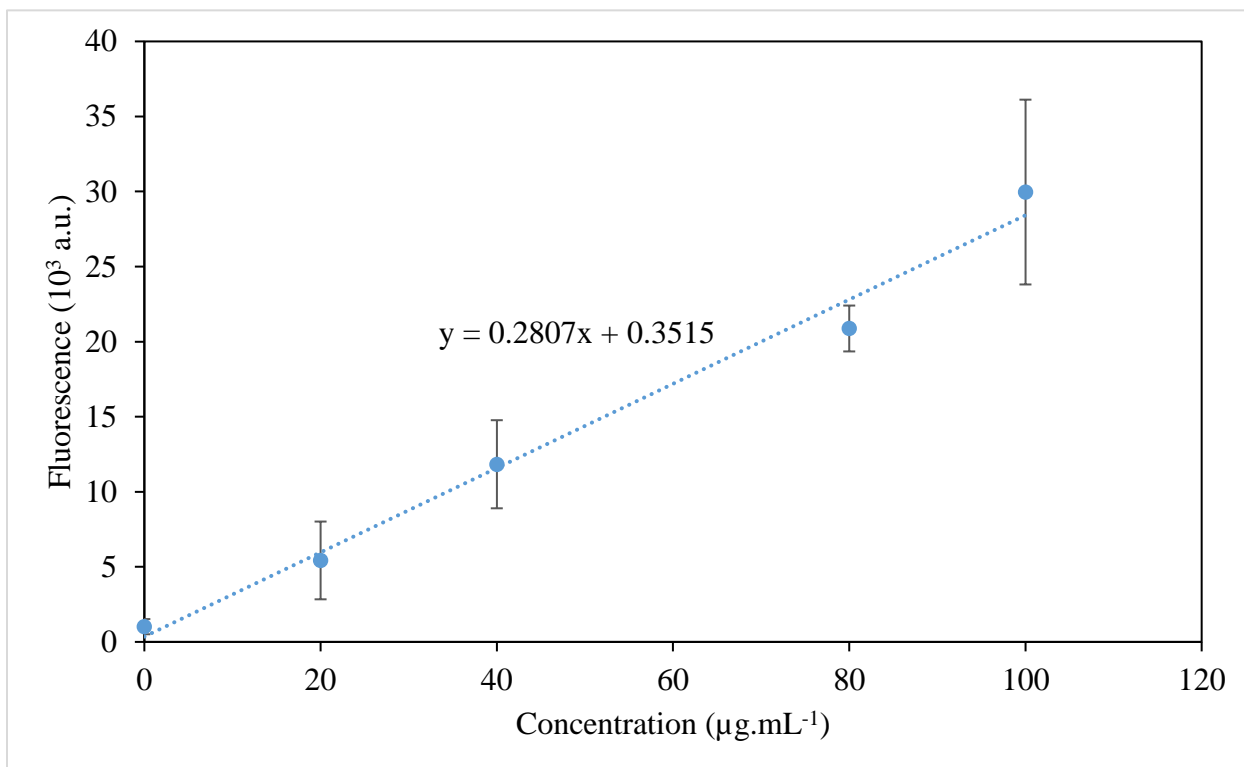


Fig. S1 Nile Red Spectrofluorimetry standard curve generated from oleic acid (OA) according to the developed protocol in this study, without initial dilution in chloroform ($R^2= 0.9874$)

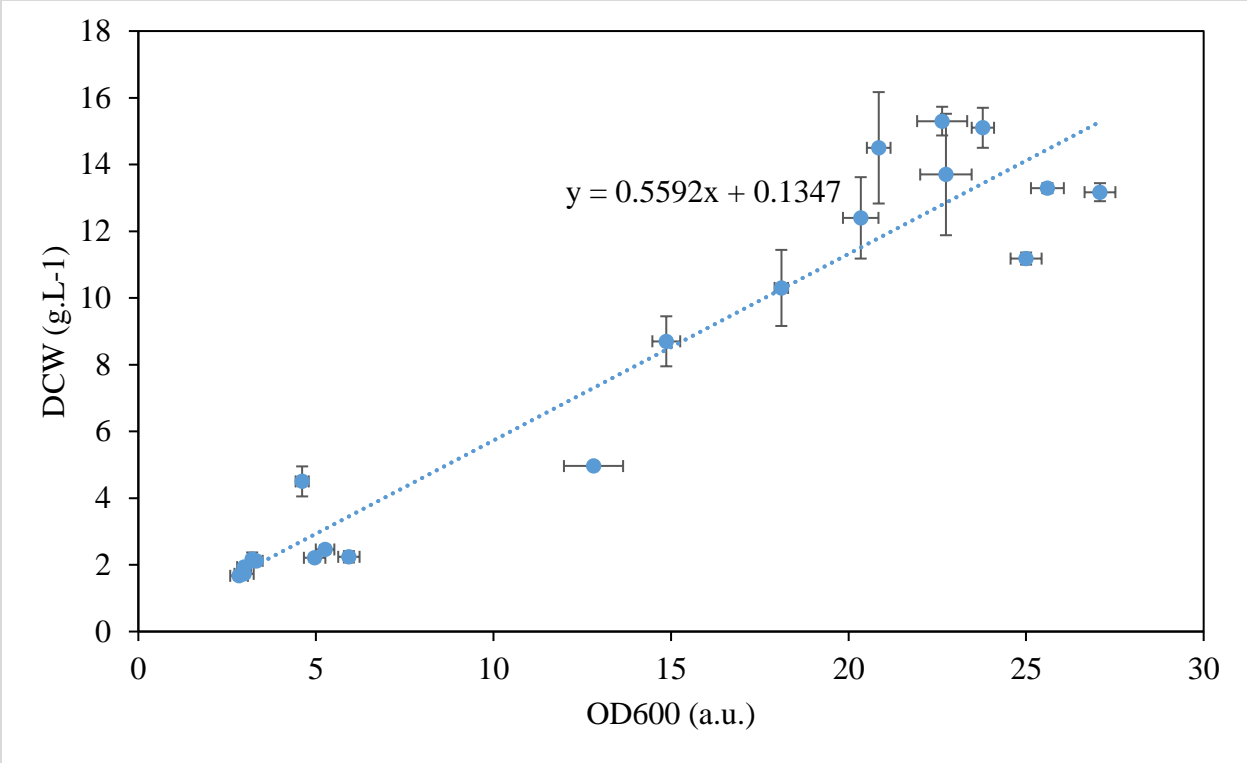


Fig. S2 Correlation between optical density measured at 600 nm and DCW (g.L⁻¹) for *C. oleaginosus* ($R^2 = 0.9237$).

Table S1 Fatty acids with representation below 1% in *C. oleagnosus* collectively referred to as "other" in Fig. 4.

Strains/ Fatty acids	FN M1	FN M2	FN M3	FN M4	FN M5	FN M6	FN M7	FN M8	FN M9	WT
C12:0	0.394 ± 0.016 (0.83)	0.339 ± 0.012 (0.71)	0.41 ± 0.004 (0.87)	0.397 ± 0.017 (0.83)	0.338 ± 0.016 (0.709)	0.355 ± 0.011 (0.75)	0.331 ± 0.008 (0.69)	0.426 ± 0.013 (0.89)	0.335 ± 0.043 (0.7)	0.477 ± 0.018
C14:0	4.726 ± 0.06 (1.04)	4.913 ± 0.042 (1.08)	5.275 ± 0.074 (1.15)	4.36 ± 0.067 (1.09)	4.835 ± 0.277 (1.06)	4.875 ± 0.128 (1.07)	4.725 ± 0.238 (1.04)	5.202 ± 0.17 (1.14)	4.896 ± 0.804 (1.07)	4.548 ± 0.098
C16:1	6.819 ± 0.037 (0.64)	5.169 ± 0.066 (0.48)	7.126 ± 0.13 (0.66)	9.262 ± 0.153 (0.86)	4.882 ± 0.458 (0.45)	5.437 ± 0.288 (0.51)	4.972 ± 0.571 (0.46)	7.874 ± 0.247 (0.73)	4.726 ± 1.624 (0.43)	10.745 ± 0.344
C18:3	2.697 ± 0.025 (0.6)	2.281 ± 0.041 (0.51)	2.505 ± 0.035 (0.56)	2.868 ± 0.032 (0.63)	2.436 ± 0.109 (0.54)	2.365 ± 0.058 (0.52)	2.296 ± 0.04 (0.51)	2.952 ± 0.083 (0.65)	2.303 ± 0.031 (0.51)	4.517 ± 0.089
C20:0	2.692 ± 0.047 (1.3)	3.806 ± 0.071 (1.83)	2.696 ± 0.115 (1.3)	2.476 ± 0.025 (1.19)	3.742 ± 0.153 (1.8)	3.205 ± 0.026 (1.54)	3.653 ± 0.14 (1.76)	2.615 ± 0.085 (1.26)	3.671 ± 0.222 (1.77)	2.077 ± 0.043
C20:1	0.586 ± 0.016 (0.82)	0.686 ± 0.043 (0.96)	0.603 ± 0.021 (0.85)	0.71 ± 0.025 (1)	0.706 ± 0.073 (0.99)	0.678 ± 0.008 (0.95)	0.661 ± 0.061 (0.93)	0.616 ± 0.023 (0.86)	0.636 ± 0.095 (0.89)	0.714 ± 0.018
C20:2	0.414 ± 0.828 (1.9)	3.915 ± 4.521E-07 (N/A)	0.0647 ± 0.091 (0.32)	6.179E-07 ± 1.026E-08 (4.44)	6.352E-07 ± 4.095E-08 (N/A)	4.085E-07 ± 3.537E-07 (N/A)	1.425E-07 ± 2.849E-07 (N/A)	6.534E-07 ± 5.817E-08 (N/A)	7.127E-07 ± 2.688E-08 (N/A)	0.166 ± 0.08
C20:4	8.146E-07 ± 4.648E-08 (N/A)	8.777 ± 9.980 (N/A)	7.200E-07 ± 9.805E-09 (N/A)	7.652E-07 ± 3.316E-08 (N/A)	9.252E-07 ± 7.676E-08 (N/A)	8.829E-07 ± 2.264E-08 (N/A)	0.081 ± 0.054 (1.19)	8.055E-07 ± 2.893E-08 (N/A)	0.056 ± 0.0788 (0.86)	0.069 ± 0.003
C20:3	0.215 ± 0.01 (1.32)	0.256 ± 0.077 (1.58)	0.176 ± 0.011 (1.22)	0.192 ± 0.019 (1.18)	0.295 ± 0.053 (1.79)	0.248 ± 0.036 (1.5)	0.356 ± 0.041 (2.23)	0.233 ± 0.033 (1.47)	0.325 ± 0.067 (2.2)	0.167 ± 0.039
C20:5	0.055 ± 0.063 (0.3)	5.244E-07 ± 3.512E-07 (N/A)	0.337 ± 0.333 (1.87)	0.109 ± 0.004 (0.6)	8.764E-07 ± 6.298E-08 (N/A)	9.137E-07 ± 9.639E-09 (N/A)	8.669E-07 ± 6.855E-08 (N/A)	0.13 ± 0.006 (0.71)	7.766E-07 ± 1.352E-09 (N/A)	0.182 ± 0.002
C22:0	1.907 ± 0.041 (1.3)	2.862 ± 0.053 (1.95)	1.908 ± 0.109 (1.3)	1.883 ± 0.099 (1.28)	2.843 ± 0.074 (1.94)	2.315 ± 0.049 (1.58)	2.848 ± 0.126 (1.94)	2.034 ± 0.072 (1.39)	2.871 ± 0.147 (1.95)	1.466 ± 0.014
C22:1	0.12 ± 0.006 (0.81)	8.742E-07 ± 9.703E-08 (N/A)	0.144 ± 0.007 (1.02)	0.067 ± 0.077 (0.47)	0.1 ± 0.07 (0.67)	0.138 ± 0.011 (0.93)	0.142 ± 0.022 (0.96)	0.053 ± 0.092 (0.4)	0.114 ± 0.007 (0.81)	0.15 ± 0.017
C24:0	4.608 ± 0.084 (1.32)	7.868 ± 0.531 (2.26)	4.805 ± 0.386 (1.37)	4.531 ± 0.196 (1.3)	7.621 ± 0.826 (2.19)	5.965 ± 0.205 (1.71)	7.374 ± 0.78 (2.12)	4.303 ± 0.229 (1.23)	7.647 ± 1.089 (2.18)	3.485 ± 0.048