microorganisms

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**Table 1 Supplementary Information**. Results of ANOVA and Tukey's HSD testing with factors irradiance, temperature and flow on ΔF/Fm' in initial biofilms. Tukey's Q below the diagonal, p value above the diagonal. Significant comparisons are red.

| | | **Run1** (20°C, 25 l h$^{-1}$) | | | **Run2** (20°C, 100 l h$^{-1}$) | | | | **Run3** (30°C, 25 l h$^{-1}$) | | | | **Run4** (30°C, 100 l h$^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 |
| **Run1** (20°C, 25 l h$^{-1}$) | LC2 | | 1 | 0 | 0.00045 | 0 | 4.47E-05 | 0 | 0 | 0 | 0 | 0 | 0.001338 | 5.26E-13 | 0 | 0 |
| | LC3 | 0.09083 | | 0 | 0.000334 | 0 | 3.22E-05 | 0 | 0 | 0 | 0 | 0 | 0.00101 | 2.89E-13 | 0 | 0 |
| | LC4 | 34.33 | 34.42 | | 0 | 0 | 0 | 0.9972 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Run2** (20°C, 100 l h$^{-1}$) | LC1 | 6.51 | 6.601 | 27.84 | | 0.000122 | 1 | 0 | 1.77E-08 | 1.70E-07 | 3.07E-10 | 3.55E-11 | 1 | 0.06936 | 5.91E-10 | 1.81E-06 |
| | LC2 | 13.41 | 13.5 | 20.96 | 6.899 | | 0.001109 | 0 | 0.9657 | 0.9973 | 0.6822 | 0.4546 | 3.59E-05 | 0.9614 | 0.7379 | 1 |
| | LC3 | 7.183 | 7.273 | 27.17 | 0.6724 | 6.227 | | 0 | 3.30E-07 | 2.71E-06 | 7.41E-09 | 9.80E-10 | 1 | 0.2395 | 1.36E-08 | 2.41E-05 |
| | LC4 | 32.84 | 32.93 | 1.703 | 26.31 | 19.39 | 25.63 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Run3** (30°C, 25 l h$^{-1}$) | LC1 | 15.62 | 15.71 | 18.76 | 9.112 | 2.213 | 8.44 | 17.17 | | 1 | 1 | 0.9999 | 3.66E-09 | 0.1036 | 1 | 1 |
| | LC2 | 15.11 | 15.2 | 19.27 | 8.596 | 1.697 | 7.924 | 17.68 | 0.5162 | | 0.9997 | 0.9947 | 3.81E-08 | 0.2552 | 0.9999 | 1 |
| | LC3 | 16.49 | 16.58 | 17.9 | 9.976 | 3.077 | 9.304 | 16.3 | 0.864 | 1.38 | | 1 | 5.54E-11 | 0.01454 | 1 | 0.9889 |
| | LC4 | 16.92 | 17.01 | 17.47 | 10.41 | 3.509 | 9.736 | 15.87 | 1.296 | 1.812 | 0.432 | | 5.85E-12 | 0.004522 | 1 | 0.9374 |
| **Run4** (30°C, 100 l h$^{-1}$) | LC1 | 6.166 | 6.257 | 28.18 | 0.3445 | 7.243 | 1.017 | 26.65 | 9.457 | 8.941 | 10.32 | 10.75 | | 0.03215 | 1.10E-10 | 4.44E-07 |
| | LC2 | 11.16 | 11.26 | 23.2 | 4.655 | 2.244 | 3.982 | 21.64 | 4.458 | 3.941 | 5.322 | 5.754 | 4.999 | | 0.01972 | 0.5282 |
| | LC3 | 16.33 | 16.42 | 17.94 | 9.841 | 2.964 | 9.171 | 16.35 | 0.7573 | 1.272 | 0.1041 | 0.5347 | 10.18 | 5.201 | | 0.9937 |
| | LC4 | 14.53 | 14.63 | 19.84 | 8.024 | 1.125 | 7.352 | 18.26 | 1.088 | 0.5716 | 1.952 | 2.384 | 8.369 | 3.37 | 1.842 | |

**Table 2 Supplementary Information.** Results of ANOVA and Tukey's HSD testing with factors irradiance, temperature and flow on ΔF/Fm' in biofilms at the last sampling day. Tukey's Q below the diagonal, p value above the diagonal. Significant comparisons are red.

| | | **Run1** (20°C, 25 l h$^{-1}$) | | | | **Run2** (20°C, 100 l h$^{-1}$) | | | | **Run3** (30°C, 25 l h$^{-1}$) | | | **Run4** (30°C, 100 l h$^{-1}$) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC1 | LC2 | LC3 |
| **Run1** (20°C, 25 l h$^{-1}$) | LC1 | | 1.25E-05 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | LC2 | 7.493 | | 0 | 0 | 1.59E-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | LC3 | 12.33 | 19.82 | | 0.006737 | 3.26E-13 | 5.41E-10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | LC4 | 17.89 | 25.39 | 5.564 | | 0 | 0.1321 | 0 | 0 | 0 | 6.46E-11 | 0 | 0 | 1.63E-06 | 1.08E-13 |
| **Run2** (20°C, 100 l h$^{-1}$) | LC1 | 1.091 | 8.584 | 11.24 | 16.8 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | LC2 | 22.17 | 29.66 | 9.837 | 4.273 | 21.07 | | 0 | 0 | 0 | 0.001956 | 1.46E-12 | 0 | 0.3105 | 4.96E-05 |
| | LC3 | 38.01 | 45.45 | 25.75 | 20.23 | 36.92 | 15.98 | | 0.000125 | 1 | 2.23E-10 | 0.02472 | 1 | 0 | 3.92E-08 |
| | LC4 | 45.14 | 52.63 | 32.81 | 27.25 | 44.05 | 22.98 | 6.853 | | 7.24E-05 | 0 | 0 | 4.99E-06 | 0 | 0 |
| **Run3** (30°C, 25 l h$^{-1}$) | LC1 | 38.13 | 45.62 | 25.8 | 20.24 | 37.04 | 15.97 | 0.1133 | 7.01 | | 2.86E-10 | 0.03006 | 1 | 0 | 5.05E-08 |
| | LC2 | 28.16 | 35.66 | 15.83 | 10.27 | 27.07 | 5.997 | 10.02 | 16.98 | 9.969 | | 0.02899 | 8.68E-09 | 0.9483 | 0.9999 |
| | LC3 | 33.15 | 40.65 | 20.83 | 15.26 | 32.06 | 10.99 | 5.059 | 11.99 | 4.977 | 4.992 | | 0.1373 | 3.15E-05 | 0.2585 |
| **Run4** (30°C, 100 l h$^{-1}$) | LC1 | 37.41 | 44.9 | 25.08 | 19.51 | 36.32 | 15.24 | 0.8336 | 7.735 | 0.7249 | 9.244 | 4.252 | | 2.84E-14 | 1.07E-06 |
| | LC2 | 25.91 | 33.4 | 13.58 | 8.019 | 24.82 | 3.746 | 12.26 | 19.23 | 12.22 | 2.251 | 7.243 | 11.49 | | 0.4931 |
| | LC3 | 29.28 | 36.78 | 16.95 | 11.39 | 28.19 | 7.117 | 8.907 | 15.86 | 8.849 | 1.12 | 3.872 | 8.124 | 3.371 | |

**Table 3 Supplementary Information.** Results of ANOVA and Tukey's HSD testing with factors irradiance, temperature and flow on rel.ETR$_{max}$ in initial biofilms. Tukey's Q below the diagonal, p value above the diagonal. Significant comparisons are red.

| | | **Run1** (20°C, 25 l h$^{-1}$) | | | **Run2** (20°C, 100 l h$^{-1}$) | | | | **Run3** (30°C, 25 l h$^{-1}$) | | | | **Run4** (30°C, 100 l h$^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 |
| **Run1** (20°C, 25 l h$^{-1}$) | LC2 | | 0.9971 | 0.001696 | 0.03957 | 9.97E-01 | 0.7089 | 0.918 | 0.787 | 0.9707 | 1 | 0.1158 | 1.59E-04 | 0.9523 | 0.2328 | 0.9203 |
| | LC3 | 1.684 | | 0.06908 | 0.00059 | 1 | 0.9998 | 1 | 0.1034 | 1 | 0.9699 | 0.8125 | 7.63E-07 | 1 | 0.9144 | 1 |
| | LC4 | 6.317 | 4.742 | | 3.66E-10 | 0.07085 | 0.4703 | 3.97E-01 | 4.71E-07 | 1.53E-01 | 4.98E-04 | 0.9719 | 2.70E-13 | 1.87E-01 | 9.71E-01 | 0.2357 |
| **Run2** (20°C, 100 l h$^{-1}$) | LC1 | 5.016 | 6.699 | 11.01 | | 0.000567 | 1.05E-05 | 0.000163 | 0.9682 | 0.000153 | 0.1008 | 8.41E-08 | 0.9723 | 0.000103 | 1.07E-06 | 6.35E-05 |
| | LC2 | 1.697 | 0.01391 | 4.729 | 6.713 | | 0.9998 | 1.00E+00 | 1.01E-01 | 1.00E+00 | 9.68E-01 | 0.818 | 7.28E-07 | 1.00E+00 | 9.18E-01 | 1 |
| | LC3 | 3.019 | 1.336 | 3.493 | 8.035 | 1.322 | | 1 | 0.005511 | 1 | 0.4705 | 0.9994 | 7.49E-09 | 1 | 0.9999 | 1 |
| | LC4 | 2.451 | 0.8766 | 3.644 | 7.143 | 0.8636 | 0.3728 | | 0.03215 | 1 | 0.7662 | 9.96E-01 | 2.71E-07 | 1 | 0.9992 | 1 |
| **Run3** (30°C, 25 l h$^{-1}$) | LC1 | 2.845 | 4.529 | 8.978 | 2.17 | 4.543 | 5.864 | 5.113 | | 0.04135 | 0.9356 | 9.89E-05 | 0.1528 | 0.03118 | 0.000585 | 0.02188 |
| | LC2 | 2.15 | 0.4661 | 4.306 | 7.165 | 0.4522 | 0.8696 | 0.4406 | 4.995 | | 0.8699 | 9.46E-01 | 1.57E-07 | 1 | 0.9822 | 1 |
| | LC3 | 0.4731 | 2.157 | 6.759 | 4.543 | 2.17 | 3.492 | 2.894 | 2.372 | 2.623 | | 4.64E-02 | 6.26E-04 | 0.8233 | 0.1122 | 0.757 |
| | LC4 | 4.466 | 2.783 | 2.139 | 9.482 | 2.769 | 1.447 | 1.726 | 7.311 | 2.317 | 4.939 | | 3.90E-11 | 9.67E-01 | 1.00E+00 | 0.9826 |
| **Run4** (30°C, 100 l h$^{-1}$) | LC1 | 7.151 | 8.835 | 13.01 | 2.136 | 8.849 | 10.17 | 9.141 | 4.306 | 9.301 | 6.678 | 11.62 | | 9.95E-08 | 1.00E-09 | 5.71E-08 |
| | LC2 | 2.282 | 0.5983 | 4.182 | 7.298 | 0.5844 | 0.7374 | 0.317 | 5.127 | 0.1322 | 2.755 | 2.184 | 9.433 | | 0.99 | 1 |
| | LC3 | 4.041 | 2.466 | 2.146 | 8.733 | 2.453 | 1.217 | 1.499 | 6.703 | 2.03 | 4.484 | 0.1367 | 10.73 | 1.907 | | 0.9955 |
| | LC4 | 2.442 | 0.7583 | 4.033 | 7.458 | 0.7444 | 0.5774 | 0.1673 | 5.287 | 0.2922 | 2.915 | 2.024 | 9.593 | 0.16 | 1.757 | |

**Table 4 Supplementary Information.** Results of ANOVA and Mann–Whitney test testing with factors irradiance, temperature and flow on rel.ETRmax in biofilms at the last sampling day. Significant comparisons are red.

| | | **Run1** (20°C, 25 l h$^{-1}$) | | | | **Run2** (20°C, 100 l h$^{-1}$) | | | | **Run3** (30°C, 25 l h$^{-1}$) | | | **Run4** (30°C, 100 l h$^{-1}$) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC1 | LC2 | LC3 |
| **Run1** (20°C, 25 l h$^{-1}$) | LC1 | | 0.4527 | 0.000412 | 0.00028 | 0.1577 | 0.000412 | 0.000412 | 0.000412 | 0.000412 | 0.00057 | 0.00179 | 0.001086 | 0.00041 | 0.000412 |
| | LC2 | 0.4527 | | 0.000412 | 0.00028 | 0.5365 | 0.000412 | 0.000412 | 0.000412 | 0.000574 | 0.00147 | 0.00179 | 0.01036 | 0.00041 | 0.000412 |
| | LC3 | 0.000412 | 0.000412 | | 0.09417 | 0.000412 | 0.5361 | 0.003569 | 0.0934 | 0.000574 | 0.00041 | 0.3165 | 0.000412 | 0.1992 | 0.6588 |
| | LC4 | 0.00028 | 0.00028 | 0.09417 | | 0.00028 | 0.00425 | 0.04994 | 0.8702 | 0.001669 | 0.001253 | 0.05768 | 0.000703 | 0.5954 | 0.153 |
| **Run2** (20°C, 100 l h$^{-1}$) | LC1 | 0.1577 | 0.5365 | 0.000412 | 0.00028 | | 0.000412 | 0.000412 | 0.000412 | 0.000923 | 0.00147 | 0.00179 | 0.006193 | 0.00041 | 0.000412 |
| | LC2 | 0.000412 | 0.000412 | 0.5361 | 0.00425 | 0.000412 | | 0.000484 | 0.000792 | 0.001478 | 0.00041 | 0.3453 | 0.000412 | 0.07724 | 0.6588 |
| | LC3 | 0.000412 | 0.000412 | 0.003569 | 0.04994 | 0.000412 | 0.000484 | | 0.0575 | 0.000412 | 0.00041 | 0.005614 | 0.000412 | 0.04215 | 0.005387 |
| | LC4 | 0.000412 | 0.000412 | 0.0934 | 0.8702 | 0.000412 | 0.000792 | 0.0575 | | 0.000412 | 0.00041 | 0.02924 | 0.000412 | 0.4797 | 0.07012 |
| **Run3** (30°C, 25 l h$^{-1}$) | LC1 | 0.000412 | 0.000574 | 0.000574 | 0.001669 | 0.000923 | 0.001478 | 0.000412 | 0.000412 | | 0.2161 | 0.2884 | 0.04226 | 0.000917 | 0.001086 |
| | LC2 | 0.00057 | 0.00147 | 0.00041 | 0.001253 | 0.00147 | 0.00041 | 0.00041 | 0.00041 | 0.2161 | | 0.0675 | 0.3311 | 0.000407 | 0.00041 |
| | LC3 | 0.00179 | 0.00179 | 0.3165 | 0.05768 | 0.00179 | 0.3453 | 0.005614 | 0.02924 | 0.2884 | 0.0675 | | 0.02156 | 0.0872 | 0.2629 |
| **Run4** (30°C, 100 l h$^{-1}$) | LC1 | 0.001086 | 0.01036 | 0.000412 | 0.000703 | 0.006193 | 0.000412 | 0.000412 | 0.000412 | 0.04226 | 0.3311 | 0.02156 | | 0.00041 | 0.000412 |
| | LC2 | 0.00041 | 0.00041 | 0.1992 | 0.5954 | 0.00041 | 0.07724 | 0.04215 | 0.4797 | 0.000917 | 0.000407 | 0.0872 | 0.00041 | | 0.3533 |
| | LC3 | 0.000412 | 0.000412 | 0.6588 | 0.153 | 0.000412 | 0.6588 | 0.005387 | 0.07012 | 0.001086 | 0.00041 | 0.2629 | 0.000412 | 0.3533 | |

**Table 5 Supplementary Information**. Results of ANOVA and Tukey's HSD testing with factors irradiance, temperature and flow on $\alpha$ in initial biofilms. Tukey's Q below the diagonal, p value above the diagonal. Significant comparisons are red.

| | | **Run1** (20°C, 25 l h$^{-1}$) | | | **Run2** (20°C, 100 l h$^{-1}$) | | | | **Run3** (30°C, 25 l h$^{-1}$) | | | | **Run4** (30°C, 100 l h$^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 |
| **Run1** (20°C, 25 l h$^{-1}$) | LC2 | | 0.9993 | 0.9978 | 0.9868 | 1 | 0.9934 | 0.1811 | 1 | 0.9962 | 0.9993 | 0.7239 | 0.997 | 0.9988 | 0.9969 | 1 |
| | LC3 | 1.466 | | 0.7127 | 1 | 0.9984 | 1 | 0.01122 | 1 | 1 | 1 | 0.1184 | 1 | 1 | 0.6871 | 1 |
| | LC4 | 1.64 | 3.011 | | 0.4781 | 0.999 | 0.5446 | 0.9261 | 0.9742 | 0.5921 | 0.7127 | 1 | 0.6101 | 0.6757 | 1 | 0.9844 |
| **Run2** (20°C, 100 l h$^{-1}$) | LC1 | 1.964 | 0.4979 | 3.477 | | 0.9776 | 1 | 0.003518 | 0.9994 | 1 | 1 | 0.04526 | 1 | 1 | 0.4515 | 0.9985 |
| | LC2 | 0.1194 | 1.586 | 1.528 | 2.084 | | 0.988 | 0.2157 | 1 | 0.9927 | 0.9984 | 0.7774 | 0.994 | 0.9973 | 0.9985 | 1 |
| | LC3 | 1.824 | 0.3581 | 3.346 | 0.1398 | 1.944 | | 0.004918 | 0.9998 | 1 | 1 | 0.06018 | 1 | 1 | 0.5174 | 0.9995 |
| | LC4 | 4.203 | 5.575 | 2.417 | 6.04 | 4.091 | 5.91 | | 0.07768 | 0.006206 | 0.01122 | 0.9996 | 0.006772 | 0.009333 | 0.9368 | 0.09703 |
| **Run3** (30°C, 25 l h$^{-1}$) | LC1 | 0.5115 | 0.9548 | 2.118 | 1.453 | 0.6309 | 1.313 | 4.681 | | 0.9999 | 1 | 0.4672 | 0.9999 | 1 | 0.9681 | 1 |
| | LC2 | 1.726 | 0.2592 | 3.254 | 0.2387 | 1.845 | 0.09889 | 5.817 | 1.214 | | 1 | 0.07311 | 1 | 1 | 0.5648 | 0.9998 |
| | LC3 | 1.466 | 0 | 3.011 | 0.4979 | 1.586 | 0.3581 | 5.575 | 0.9548 | 0.2592 | | 0.1184 | 1 | 1 | 0.6871 | 1 |
| | LC4 | 2.987 | 4.454 | 1.155 | 4.952 | 2.868 | 4.812 | 1.409 | 3.499 | 4.713 | 4.454 | | 0.07859 | 0.1021 | 1 | 0.5311 |
| **Run4** (30°C, 100 l h$^{-1}$) | LC1 | 1.688 | 0.2217 | 3.219 | 0.2762 | 1.807 | 0.1364 | 5.782 | 1.177 | 0.03751 | 0.2217 | 4.675 | | 1 | 0.5828 | 0.9998 |
| | LC2 | 1.548 | 0.08184 | 3.088 | 0.416 | 1.668 | 0.2762 | 5.651 | 1.037 | 0.1773 | 0.08184 | 4.536 | 0.1398 | | 0.6492 | 1 |
| | LC3 | 1.693 | 3.065 | 0.05027 | 3.53 | 1.581 | 3.4 | 2.366 | 2.171 | 3.307 | 3.065 | 1.101 | 3.272 | 3.141 | | 0.9803 |
| | LC4 | 0.3853 | 1.081 | 2 | 1.579 | 0.5047 | 1.439 | 4.563 | 0.1262 | 1.34 | 1.081 | 3.373 | 1.303 | 1.163 | 2.053 | |

**Table 6 Supplementary Information.** Results of ANOVA and Tukey's HSD testing with factors irradiance, temperature and flow on $\alpha$ in biofilms at the last sampling day. Tukey's Q below the diagonal, p value above the diagonal. Significant comparisons are red.

| | | **Run1** (20°C, 25 l h$^{-1}$) | | | | **Run2** (20°C, 100 l h$^{-1}$) | | | | **Run3** (30°C, 25 l h$^{-1}$) | | | **Run4** (30°C, 100 l h$^{-1}$) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC1 | LC2 | LC3 |
| **Run1** (20°C, 25 l h$^{-1}$) | LC1 | | 0.5103 | 0.000146 | 1.11E-05 | 0.252 | 1.03E-07 | 5.47E-14 | 0 | 2.46E-07 | 6.51E-05 | 0.08684 | 3.99E-08 | 7.69E-08 | 1.41E-07 |
| | LC2 | 3.348 | | 0.3 | 0.08843 | 1 | 0.002964 | 3.31E-10 | 5.92E-14 | 0.005687 | 0.2031 | 0.9976 | 0.001429 | 0.002372 | 0.003756 |
| | LC3 | 7.149 | 3.802 | | 1 | 0.5738 | 0.9426 | 0.000111 | 4.81E-09 | 0.9777 | 1 | 0.9902 | 0.8736 | 0.925 | 0.958 |
| | LC4 | 7.993 | 4.558 | 0.6579 | | 0.2385 | 0.9959 | 0.000434 | 1.89E-08 | 0.9993 | 1 | 0.8997 | 0.9827 | 0.9933 | 0.9977 |
| **Run2** (20°C, 100 l h$^{-1}$) | LC1 | 3.927 | 0.5788 | 3.223 | 3.964 | | 0.01241 | 2.63E-09 | 1.01E-13 | 0.02233 | 0.4385 | 1 | 0.006375 | 0.01013 | 0.01538 |
| | LC2 | 9.412 | 6.064 | 2.263 | 1.663 | 5.485 | | 0.03837 | 9.81E-06 | 1 | 0.9789 | 2.81E-01 | 1 | 1 | 1 |
| | LC3 | 14.39 | 11.04 | 7.241 | 6.772 | 10.46 | 4.979 | | 0.6598 | 0.022 | 2.44E-04 | 4.11E-06 | 0.06716 | 0.04584 | 3.16E-02 |
| | LC4 | 17.44 | 14.09 | 10.29 | 9.903 | 13.52 | 8.031 | 3.052 | | 4.33E-06 | 1.24E-08 | 3.43E-10 | 2.33E-05 | 1.29E-05 | 7.33E-06 |
| **Run3** (30°C, 25 l h$^{-1}$) | LC1 | 9.155 | 5.808 | 2.006 | 1.4 | 5.229 | 0.2565 | 5.235 | 8.287 | | 9.94E-01 | 0.378 | 1 | 1 | 1 |
| | LC2 | 7.419 | 4.071 | 0.2697 | 0.3813 | 3.492 | 1.993 | 6.972 | 10.02 | 1.736 | | 0.9714 | 9.41E-01 | 0.9702 | 0.986 |
| | LC3 | 4.568 | 1.574 | 1.827 | 2.45 | 1.056 | 3.85 | 8.304 | 11.03 | 3.621 | 2.068 | | 0.195 | 2.52E-01 | 0.3138 |
| **Run4** (30°C, 100 l h$^{-1}$) | LC1 | 9.688 | 6.34 | 2.539 | 1.947 | 5.762 | 0.2762 | 4.703 | 7.755 | 0.5328 | 2.269 | 4.097 | | 1 | 1 |
| | LC2 | 9.497 | 6.15 | 2.348 | 1.751 | 5.571 | 0.0855 | 4.893 | 7.945 | 0.342 | 2.078 | 3.927 | 0.1907 | | 1 |
| | LC3 | 9.32 | 5.972 | 2.17 | 1.569 | 5.393 | 0.09208 | 5.071 | 8.123 | 0.1644 | 1.901 | 3.768 | 0.3683 | 0.1776 | |

**Table 7 Supplementary Information**. Results of ANOVA and Tukey's HSD testing with factors irradiance, temperature and flow on $I_k$ in initial biofilms. Tukey's Q below the diagonal, p value above the diagonal. Significant comparisons are red.

| | | **Run1** (20°C, 25 l h$^{-1}$) | | | **Run2** (20°C, 100 l h$^{-1}$) | | | | **Run3** (30°C, 25 l h$^{-1}$) | | | | **Run4** (30°C, 100 l h$^{-1}$) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 |
| **Run1** (20°C, 25 l h$^{-1}$) | LC2 | | 0.9968 | 0.9675 | 1 | 1.00E+00 | 0.8906 | 0.08584 | 1 | 0.6831 | 1 | 1 | 9.54E-01 | 1 | 0.9999 | 0.9998 |
| | LC3 | 1.7 | | 1 | 0.8496 | 1 | 1 | 0.002199 | 0.8335 | 0.06498 | 0.9707 | 0.9998 | 2.58E-01 | 0.9994 | 1 | 1 |
| | LC4 | 2.177 | 0.5861 | | 6.72E-01 | 0.9999 | 1 | 1.29E-03 | 6.51E-01 | 3.67E-02 | 8.78E-01 | 0.9944 | 1.55E-01 | 9.88E-01 | 1.00E+00 | 1 |
| **Run2** (20°C, 100 l h$^{-1}$) | LC1 | 0.9827 | 2.683 | 3.096 | | 0.9838 | 4.48E-01 | 0.3662 | 1 | 0.977 | 1 | 1.00E+00 | 0.9999 | 0.9999 | 9.65E-01 | 9.48E-01 |
| | LC2 | 1.026 | 0.6742 | 1.217 | 2.009 | | 0.9989 | 1.09E-02 | 9.80E-01 | 2.13E-01 | 9.99E-01 | 1 | 5.71E-01 | 1.00E+00 | 1.00E+00 | 1 |
| | LC3 | 2.555 | 0.8548 | 0.2135 | 3.538 | 1.529 | | 0.000235 | 0.426 | 0.009874 | 0.716 | 0.9708 | 5.87E-02 | 0.9492 | 1 | 0.9999 |
| | LC4 | 4.629 | 6.22 | 6.416 | 3.71 | 5.589 | 7.019 | | 0.3854 | 0.9955 | 0.1793 | 4.01E-02 | 9.04E-01 | 0.0538 | 0.0113 | 0.005464 |
| **Run3** (30°C, 25 l h$^{-1}$) | LC1 | 1.027 | 2.728 | 3.138 | 0.04457 | 2.053 | 3.582 | 3.668 | | 0.9809 | 1 | 1.00E+00 | 0.9999 | 0.9999 | 0.9586 | 0.9397 |
| | LC2 | 3.073 | 4.773 | 5.051 | 2.09 | 4.099 | 5.628 | 1.755 | 2.045 | | 0.8696 | 4.77E-01 | 1.00E+00 | 0.5542 | 0.1955 | 0.1308 |
| | LC3 | 0.4491 | 2.149 | 2.597 | 0.5336 | 1.475 | 3.004 | 4.209 | 0.5782 | 2.624 | | 1.00E+00 | 9.94E-01 | 1 | 0.9968 | 0.995 |
| | LC4 | 0.4068 | 1.294 | 1.796 | 1.39 | 0.6194 | 2.148 | 5.01 | 1.434 | 3.48 | 0.8559 | | 8.52E-01 | 1.00E+00 | 1.00E+00 | 1 |
| **Run4** (30°C, 100 l h$^{-1}$) | LC1 | 2.269 | 3.97 | 4.299 | 1.287 | 3.296 | 4.825 | 2.506 | 1.242 | 0.8033 | 1.82 | 2.676 | | 8.99E-01 | 5.15E-01 | 4.21E-01 |
| | LC2 | 0.2548 | 1.446 | 1.938 | 1.238 | 0.7713 | 2.3 | 4.867 | 1.282 | 3.328 | 0.7039 | 0.152 | 2.524 | | 1 | 1 |
| | LC3 | 1.281 | 0.31 | 0.8448 | 2.2 | 0.3207 | 1.11 | 5.572 | 2.242 | 4.155 | 1.701 | 0.9 | 3.403 | 1.042 | | 1 |
| | LC4 | 1.324 | 0.376 | 0.9377 | 2.307 | 0.2982 | 1.231 | 5.868 | 2.352 | 4.397 | 1.773 | 0.9176 | 3.594 | 1.07 | 0.04169 | |

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**Table 8 Supplementary Information.** Results of ANOVA and Tukey's HSD testing with factors irradiance, temperature and flow on $I_k$ in biofilms at the last sampling day. Tukey's Q below the diagonal, p value above the diagonal. Significant comparisons are red.

| | | **Run1** (20°C, 25 l h$^{-1}$) | | | | **Run2** (20°C, 100 l h$^{-1}$) | | | | **Run3** (30°C, 25 l h$^{-1}$) | | | **Run4** (30°C, 100 l h$^{-1}$) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC4 | LC1 | LC2 | LC3 | LC1 | LC2 | LC3 |
| **Run1** (20°C, 25 l h$^{-1}$) | LC1 | | 0.9997 | 0.02749 | 0.1192 | 1 | 2.75E-01 | 7.93E-03 | 0.9902 | 1 | 1 | 0.38 | 0.832 | 0.02154 | 0.1445 |
| | LC2 | 1.269 | | 0.001206 | 0.007512 | 1 | 0.02757 | 2.67E-04 | 1 | 0.9995 | 0.9995 | 0.06108 | 0.9993 | 0.000892 | 0.01064 |
| | LC3 | 5.135 | 6.403 | | 1 | 0.00194 | 0.9997 | 1 | 2.53E-04 | 0.03302 | 0.03329 | 1 | 2.06E-05 | 1 | 1 |
| | LC4 | 4.393 | 5.695 | 0.8747 | | 0.01163 | 1 | 0.9991 | 1.74E-03 | 0.1386 | 0.1396 | 1 | 0.000157 | 1 | 1 |
| **Run2** (20°C, 100 l h$^{-1}$) | LC1 | 1.091 | 0.1772 | 6.226 | 5.513 | | 0.04025 | 4.43E-04 | 1 | 0.9999 | 0.9999 | 0.08294 | 0.9977 | 0.001444 | 0.0161 |
| | LC2 | 3.865 | 5.133 | 1.27 | 0.4281 | 4.956 | | 0.991 | 7.59E-03 | 0.3088 | 0.3104 | 1 | 0.000864 | 0.9994 | 1 |
| | LC3 | 5.673 | 6.941 | 0.538 | 1.427 | 6.764 | 1.808 | | 5.12E-05 | 0.009731 | 9.82E-03 | 0.9989 | 3.73E-06 | 1 | 0.9993 |
| | LC4 | 1.826 | 0.5572 | 6.96 | 6.266 | 0.7344 | 5.691 | 7.498 | | 9.85E-01 | 9.85E-01 | 2.13E-02 | 1.00E+00 | 1.83E-04 | 2.65E-03 |
| **Run3** (30°C, 25 l h$^{-1}$) | LC1 | 0.08474 | 1.353 | 5.05 | 4.306 | 1.176 | 3.78 | 5.588 | 1.911 | | 1 | 0.4154 | 0.7992 | 0.02599 | 0.1663 |
| | LC2 | 0.08859 | 1.357 | 5.046 | 4.302 | 1.18 | 3.776 | 5.584 | 1.914 | 0.003852 | | 0.4171 | 0.7977 | 0.02621 | 0.1673 |
| | LC3 | 3.616 | 4.751 | 0.9762 | 0.218 | 4.593 | 0.1596 | 1.457 | 5.249 | 3.541 | 3.537 | | 0.003534 | 1 | 1 |
| **Run4** (30°C, 100 l h$^{-1}$) | LC1 | 2.66 | 1.392 | 7.795 | 7.123 | 1.569 | 6.525 | 8.333 | 0.8346 | 2.745 | 2.749 | 5.996 | | 1.46E-05 | 0.000266 |
| | LC2 | 5.245 | 6.514 | 0.1104 | 0.988 | 6.336 | 1.38 | 0.4276 | 7.071 | 5.16 | 5.156 | 1.075 | 7.905 | | 1 |
| | LC3 | 4.282 | 5.551 | 0.8526 | 0 | 5.373 | 0.4173 | 1.391 | 6.108 | 4.197 | 4.193 | 0.2136 | 6.942 | 0.963 | |

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35 **Table 9 Supplementary Information.** Results of Spearman's rho-statistic applied to test the correlation between Chl *a* and AFDW.

| Variable A | Variable B | rho | magnitude | p-Value |
|---|---|---|---|---|
| Chl *a* concentration | AFDW | 0.8336164 | 0.6949163 | 1.58E-08 |

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