

pH-stat controlled at 7.0

| Day | OD | OD | Mean OD | Std DeV | ln(mean DO) | biomass (g/ | volume (L) |
|-----|----|------|---------|---------|-------------|-------------|------------|
| 0 | | 0.2 | 0.14 | 0.17 | 0.04 | 0 | 0.07 0.5 |
| 1 | | 0.37 | 0.32 | 0.345 | 0.04 | 0.71 | 0.15 0.493 |
| 2 | | 0.84 | | 0.84 | 0.00 | 1.60 | 0.37 0.486 |
| 3 | | 1.94 | 1.45 | 1.695 | 0.35 | 2.30 | 0.74 0.479 |
| 4 | | 3.35 | 3.3 | 3.325 | 0.04 | 2.97 | 1.46 0.544 |
| 5 | | 4.75 | 5.8 | 5.275 | 0.74 | 3.43 | 2.32 0.593 |
| 6 | | 7 | 9.5 | 8.25 | 1.77 | 3.88 | 3.62 0.673 |
| 7 | | 10 | 12.5 | 11.25 | 1.77 | 4.19 | 4.94 0.686 |
| 8 | | 14 | 15 | 14.5 | 0.71 | 4.45 | 6.37 0.679 |
| 9 | | 19.5 | | 19.5 | 0.00 | 4.74 | 8.56 0.672 |
| 10 | | 21 | 18.5 | 19.75 | 1.77 | 4.76 | 8.67 0.665 |
| 11 | | 18.5 | 18.5 | 18.5 | 0.00 | 4.69 | 8.12 0.658 |

Td 0.95 day 22.8 h

pH-stat controlled at 7.0 log CFU/mL

| Day | C2 | C4 | log (CFU/mL) | mean Log | Std Dev | mean CFU | std dev |
|-----|----------|----------|--------------|----------|---------|----------|-------------------|
| 0 | 4.44E+05 | 6.00E+06 | 5.65 | 6.78 | 6.21 | 0.80 | 3.22E+06 3.93E+06 |
| 1 | 2.60E+06 | 9.50E+06 | 6.41 | 6.98 | 6.70 | 0.40 | 6.05E+06 4.88E+06 |
| 2 | 6.56E+06 | | 6.82 | | 6.82 | | 6.56E+06 |
| 3 | 1.54E+07 | 9.50E+07 | 7.19 | 7.98 | 7.58 | 0.56 | 5.52E+07 5.63E+07 |
| 4 | 2.81E+07 | 2.13E+08 | 7.45 | 8.33 | 7.89 | 0.62 | 1.20E+08 1.30E+08 |
| 5 | 3.31E+07 | 2.73E+08 | 7.52 | 8.44 | 7.98 | 0.65 | 1.53E+08 1.69E+08 |
| 6 | 3.47E+07 | 3.93E+08 | 7.54 | 8.59 | 8.07 | 0.74 | 2.14E+08 2.53E+08 |
| 7 | 7.63E+07 | 3.85E+08 | 7.88 | 8.59 | 8.23 | 0.50 | 2.31E+08 2.18E+08 |
| 8 | 5.75E+07 | | 7.76 | | 7.76 | | 5.75E+07 |
| 10 | | 3.10E+08 | | 8.49 | 8.49 | | 3.10E+08 |
| 11 | | 1.98E+08 | | 8.30 | 8.30 | | 1.98E+08 |

pH-stat controlled at 7.0

| Before freeze-drying | | | | | | | After freeze-drying | | | | | | |
|----------------------|----------|------------|-----------|----------|---------|-------|---------------------|--------------|----------|----------|---------|-------|--|
| Day | Results | Log CFU/mL | Log CFU/m | mean Log | Std dev | | Results | Log (CFU/mL) | Log | mean Log | Std dev | | |
| 5 | 1.56E+07 | 7.19 | 1.85E+08 | 8.27 | 7.73 | 0.759 | 9.50E+06 | 6.98 | 1.20E+08 | 8.08 | 7.53 | 0.779 | |
| 6 | 2.03E+07 | 7.31 | 3.90E+08 | 8.59 | 7.95 | 0.908 | 1.86E+07 | 7.27 | 2.78E+08 | 8.44 | 7.86 | 0.830 | |
| 7 | 1.20E+08 | 8.08 | 3.78E+08 | 8.58 | 8.33 | 0.352 | 1.86E+07 | 7.27 | 3.08E+08 | 8.49 | 7.88 | 0.861 | |
| 8 | 2.17E+07 | 7.34 | 3.80E+08 | 8.58 | 7.96 | 0.880 | 2.18E+07 | 7.34 | 3.78E+08 | 8.58 | 7.96 | 0.876 | |
| 9 | 3.68E+07 | 7.57 | 3.21E+08 | 8.51 | 8.04 | 0.666 | 1.73E+07 | 7.24 | 2.57E+08 | 8.41 | 7.82 | 0.830 | |
| 10 | 4.30E+07 | 7.63 | 3.05E+08 | 8.48 | 8.06 | 0.602 | 4.30E+07 | 7.63 | 2.90E+08 | 8.46 | 8.05 | 0.586 | |
| 11 | 3.68E+07 | 7.57 | 2.90E+08 | 8.46 | 8.01 | 0.634 | 3.68E+07 | 7.57 | 2.60E+08 | 8.41 | 7.99 | 0.601 | |

Substrate pH-stat controlled at 7.0

| Glutamate (g/L) | | | | | | | Feed solution consumption | | | |
|-----------------|-------|-------|------------|---------|------------|------------------------|---------------------------|----------------|----------|------------------|
| Day | C2 | C4 | mean (g/L) | Std dev | volume (L) | Residual glutamate (g) | Day | Consumed Volun | Mass (g) | Final mass (g/L) |
| 0 | 2.710 | | 2.410 | 0.000 | 0.5 | 1.351 | | | | |
| 1 | 2.703 | 1.838 | 2.270 | 0.611 | 0.493 | 1.336 | | | | |
| 2 | 2.410 | 1.817 | 2.264 | 0.631 | 0.486 | 1.171 | | | | |
| 3 | 1.955 | | 1.955 | 0.000 | 0.479 | 0.936 | | | | |
| 4 | 2.223 | | 2.223 | 0.000 | 0.544 | 1.209 | | | | |
| 5 | 2.103 | 1.735 | 1.919 | 0.260 | 0.593 | 1.247 | 3 | 72.18 | 0.541 | 0.271 |
| 6 | 1.590 | 0.964 | 1.277 | 0.443 | 0.673 | 1.070 | 4 | 56.40 | 0.423 | 0.212 |
| 7 | 0.193 | 0.444 | 0.318 | 0.178 | 0.686 | 0.132 | 5 | 87.23 | 0.654 | 0.327 |
| 8 | 0.008 | 0.049 | 0.028 | 0.029 | 0.679 | 0.005 | 6 | 20.93 | 0.157 | 0.078 |
| 9 | 0.005 | 0.000 | 0.003 | 0.001 | 0.672 | 0.003 | | | | |
| 10 | 0.008 | 0.000 | 0.004 | 0.000 | 0.665 | 0.005 | | | | |
| 11 | 0.008 | 0.000 | 0.004 | 0.000 | 0.658 | 0.005 | | | | |

| Day | Glucose (g/L) | | pH-stat controlled at 7.0 | | | | | Biomass (g Produced biomass (g)) | |
|-----|---------------|-------|---------------------------|---------|------------|---------------|-------------|----------------------------------|-------|
| | C2 | C4 | mean (g/L) | std dev | volume (L) | Residual gluc | Consumption | | |
| 0 | 2.157 | 2.273 | 2.215 | 0.082 | 0.5 | 1.078 | 0.000 | 0.088 | 0.000 |
| 1 | 1.989 | 2.164 | 2.076 | 0.123 | 0.493 | 0.981 | 0.098 | 0.162 | 0.075 |
| 2 | 1.706 | | 1.706 | 0.000 | 0.486 | 0.829 | 0.249 | 0.369 | 0.281 |
| 3 | 1.604 | 2.071 | 1.604 | 0.330 | 0.479 | 0.768 | 0.310 | 0.852 | 0.764 |
| 4 | 0.507 | 2.335 | 0.881 | 0.528 | 0.544 | 0.276 | 0.802 | 1.471 | 1.383 |
| 5 | 0.000 | 1.255 | 0.251 | 0.125 | 0.593 | 0 | 1.078 | 2.085 | 1.997 |
| 6 | 0.000 | 0.000 | 0.000 | 0.000 | 0.673 | 0 | 1.078 | 3.073 | 2.985 |
| 7 | 0.000 | 0.000 | 0.000 | 0.000 | 0.686 | 0 | 1.078 | 4.390 | 4.302 |
| 8 | 0.000 | 0.000 | 0.000 | 0.000 | 0.679 | 0 | 1.078 | 6.146 | 6.058 |
| 9 | 0.000 | 0.000 | 0.000 | 0.000 | 0.672 | 0 | 1.078 | 8.561 | 8.473 |
| 10 | 0.000 | 0.000 | 0.000 | 0.000 | 0.665 | 0 | 1.078 | 9.219 | 9.131 |
| 11 | 0.000 | 0.000 | 0.000 | 0.000 | 0.658 | 0 | 1.078 | 8.122 | 8.034 |

| Day | Glycerol (g/L) | | pH-stat controlled at 7.0 | | | | |
|-----|----------------|------|---------------------------|---------|------------|----------------|-------------|
| | C2 | C4 | mean (g/L) | std dev | volume (L) | Residual glyco | Consumption |
| 0 | 16.5 | 23.0 | 19.8 | 4.6 | 0.5 | 8.2 | 0.0 |
| 1 | 16.1 | 22.9 | 19.2 | 5.2 | 0.493 | 8.0 | 0.3 |
| 2 | 15.6 | 22.3 | 19.2 | 4.4 | 0.486 | 7.6 | 0.7 |
| 3 | 13.7 | 20.8 | 17.2 | 5.0 | 0.479 | 6.6 | 1.7 |
| 4 | 12.1 | 11.8 | 11.9 | 0.2 | 0.544 | 6.6 | 1.7 |
| 5 | 8.9 | | 10.3 | 2.0 | 0.593 | 5.3 | 2.9 |
| 6 | 8.4 | 7.1 | 8.4 | 0.9 | 0.673 | 5.6 | 2.6 |
| 7 | 6.9 | | 6.9 | 0.0 | 0.686 | 4.7 | 3.5 |
| 8 | 4.3 | 5.2 | 4.7 | 0.0 | 0.679 | 2.9 | 5.4 |
| 9 | 0.9 | | 0.9 | 0.0 | 0.672 | 0.6 | 7.7 |
| 10 | 0.0 | | 0.0 | 0.0 | 0.665 | 0.0 | 8.2 |
| 11 | 0.0 | | 0.0 | 0.0 | 0.658 | 0.0 | 8.2 |

pH-stat controlled at 7.2

| Dia | C7 OD | C8 OD | Mean OD | ln (Mean OD) | Std Dev | Biomass (g/L) | Volume (L) | Biomass (g) |
|-----|----------|----------|---------|--------------|---------|---------------|------------|-------------|
| 0 | | 0.2 | 0.23 | 0.215 | 0 | 0.02 | 0.09 | 0.45 |
| 1 | | 0.47 | 0.55 | 0.51 | 0.86 | 0.06 | 0.22 | 0.445 |
| 2 | | 0.84 | 1.04 | 0.94 | 1.48 | 0.14 | 0.41 | 0.44 |
| 3 | | 1.4 | 2.45 | 1.925 | 2.19 | 0.74 | 0.85 | 0.435 |
| 4 | | 3.3 | 4.2 | 3.75 | 2.86 | 0.64 | 1.65 | 0.456 |
| 5 | | 6.4 | 6.8 | 6.6 | 3.42 | 0.28 | 2.90 | 0.5308 |
| 6 | | 7 | 9.8 | 8.4 | 3.67 | 1.98 | 3.69 | 0.6104 |
| 7 | | 9.6 | 13.5 | 11.55 | 3.98 | 2.76 | 5.07 | 0.6351 |
| 8 | | 11 | 15.5 | 13.25 | 4.12 | 3.18 | 5.82 | 0.683 |
| 9 | | 10.5 | 19.7 | 15.1 | 4.25 | 6.51 | 6.63 | 0.678 |
| 10 | | 13 | 19 | 16 | 4.31 | 4.24 | 7.02 | 0.673 |

Td 0.95 day 22.9 h

pH-stat controlled at 7.2 log CFU/mL

| Day | C7 CFU/mL | C8 CFU/mL | C7 log | C8 log | Mean log | Std Dev | Mean CFU | Std Dev | |
|-----|--------------|--------------|-----------|-----------|----------|---------|----------|----------|----------|
| 0 | 3.91E+06 | 6.08E+06 | 6.59 | 6.59 | 6.78 | 6.69 | 0.136 | 4.99E+06 | 1.53E+06 |
| 1 | 5.02E+06 | 7.63E+06 | 6.70 | 6.70 | 6.88 | 6.79 | 0.128 | 6.32E+06 | 1.84E+06 |
| 2 | 4.06E+06 | 9.00E+06 | 6.61 | 6.61 | 6.95 | 6.78 | 0.244 | 6.53E+06 | 3.49E+06 |
| 3 | 1.72E+07 | 4.09E+07 | 7.24 | 7.24 | 7.61 | 7.42 | 0.267 | 2.91E+07 | 1.68E+07 |
| 4 | 2.31E+07 | 6.34E+07 | 7.36 | 7.36 | 7.80 | 7.58 | 0.310 | 4.33E+07 | 2.85E+07 |
| 5 | 9.25E+07 | 1.02E+08 | 7.97 | 7.97 | 8.01 | 7.99 | 0.030 | 9.72E+07 | 6.63E+06 |
| 6 | 1.13E+08 | 4.38E+07 | 8.05 | 8.05 | 7.64 | 7.85 | 0.292 | 7.84E+07 | 4.91E+07 |
| 7 | 7.38E+07 | 1.05E+08 | 7.87 | 7.87 | 8.02 | 7.94 | 0.108 | 8.94E+07 | 2.21E+07 |
| 8 | 1.71E+08 | 2.06E+08 | 8.23 | 8.23 | 8.31 | 8.27 | 0.056 | 1.88E+08 | 2.43E+07 |
| 9 | 1.50E+08 | 3.75E+08 | 8.18 | 8.18 | 8.57 | 8.38 | 0.281 | 2.63E+08 | 1.59E+08 |
| 10 | 2.46E+08 | 1.11E+09 | 8.39 | 8.39 | 9.05 | 8.72 | 0.463 | 6.79E+08 | 6.13E+08 |

pH-stat controlled at 7.2 Before freeze-drying

| Day | C7 | C8 | C7 - log | C8 - log | Mean log | Std Dev | |
|-----|----|----------|------------|----------|----------|---------|-------|
| 5 | | 8.75E+07 | | 7.94 | 7.94 | 0 | |
| 6 | | 1.34E+08 | 113750000 | 8.13 | 8.06 | 8.09 | 0.050 |
| 7 | | 8.75E+07 | 433750000 | 7.94 | 8.64 | 8.29 | 0.492 |
| 8 | | 1.03E+08 | 330000000 | 8.01 | 8.52 | 8.26 | 0.359 |
| 9 | | 1.73E+08 | 468750000 | 8.24 | 8.67 | 8.45 | 0.307 |
| 10 | | 1.04E+08 | 1825000000 | 8.02 | 9.26 | 8.64 | 0.881 |

pH-stat controlled at 7.2 After freeze-drying

| Day | C7 | C8 | C7 - log | C8 - log | Mean log | Std Dev | |
|-----|----|----------|----------|----------|----------|---------|-------|
| 5 | | 1.76E+07 | | 7.25 | 7.25 | 0 | |
| 6 | | | 8.88E+07 | | 7.95 | 7.95 | 0 |
| 7 | | 3.91E+07 | 1.40E+08 | 7.59 | 8.15 | 7.87 | 0.392 |
| 8 | | 8.13E+06 | 8.63E+07 | 6.91 | 7.94 | 7.42 | 0.725 |
| 9 | | 6.75E+06 | 1.33E+08 | 6.83 | 8.12 | 7.48 | 0.914 |
| 10 | | | 5.38E+08 | | 8.73 | 8.73 | 0 |

pH-stat controlled at 7.2 Substrate

| | C7 | C8 | | | |
|-----|-----------------|-----------------|------------|---------|-------------|
| Day | Glutamate (g/L) | Glutamate (g/L) | Mean (g/L) | Std Dev | Consumption |
| 0 | 2.91 | 2.63 | 2.77 | 0.198 | 0.00 |
| 1 | 2.58 | 2.63 | 2.60 | 0.035 | 0.17 |
| 2 | 2.23 | 2.30 | 2.26 | 0.049 | 0.51 |
| 3 | 1.60 | 1.71 | 1.66 | 0.078 | 1.12 |
| 4 | 1.66 | 1.76 | 1.71 | 0.074 | |
| 5 | 1.14 | 1.23 | 1.18 | 0.067 | 1.59 |
| 6 | 1.09 | 0.68 | 0.88 | 0.293 | 1.89 |
| 7 | 1.37 | 0.02 | 0.70 | 0.955 | 2.08 |
| 8 | 1.03 | 0.00 | 0.52 | 0.728 | 2.26 |
| 9 | 0.84 | 0.01 | 0.42 | 0.583 | 2.35 |
| 10 | 0.51 | 0 | 0.26 | 0.361 | 2.52 |

pH-stat controlled at 7.2

| Day | C7 Glucose (g/L) | C8 Glucose (g/L) | Mean (g/L) | Std Dev | Consumption |
|------------|-------------------------|-------------------------|-------------------|----------------|--------------------|
| 0 | 2.0325 | 2.02183 | 2.03 | 0.008 | 0.00 |
| 1 | 2.05025 | 2.00529 | 2.03 | 0.032 | 0.00 |
| 2 | 2.05833 | 1.95525 | 2.01 | 0.073 | 0.02 |
| 3 | 1.97725 | 1.83012 | 1.90 | 0.104 | 0.12 |
| 4 | 1.80438 | 1.39506 | 1.60 | 0.289 | 0.43 |
| 5 | 1.2871 | 0.95554 | 1.12 | 0.234 | 0.91 |
| 6 | 0.90287 | 0.69662 | 0.80 | 0.146 | 1.23 |
| 7 | 0.61477 | 0.39331 | 0.50 | 0.157 | 1.52 |
| 8 | 0.39542 | 0.25916 | 0.33 | 0.096 | 1.70 |
| 9 | 0.27116 | 0.12638 | 0.20 | 0.102 | 1.83 |
| 10 | 0.19775 | 0.0516 | 0.12 | 0.103 | 1.90 |

pH-stat controlled at 7.2

| Day | C7 Glycerol (g/L) | C8 Glycerol (g/L) | Mean (g/L) | Std Dev | Consumption |
|------------|--------------------------|--------------------------|-------------------|----------------|--------------------|
| 0 | 21.91 | 21.35886 | 21.63 | 0.388 | 0.00 |
| 1 | 22.37 | 21.48591 | 21.93 | 0.622 | -0.29 |
| 2 | 22.47 | 20.95582 | 21.71 | 1.071 | -0.08 |
| 3 | 22.40 | 20.74216 | 21.57 | 1.169 | 0.06 |
| 4 | 21.84 | 16.9354 | 19.39 | 3.469 | 2.25 |
| 5 | 17.36 | 12.92432 | 15.14 | 3.140 | 6.49 |
| 6 | 13.90 | 11.12848 | 12.51 | 1.958 | 9.12 |
| 7 | 11.14 | 7.62486 | 9.38 | 2.485 | 12.25 |
| 8 | 8.32 | 4.9311 | 6.62 | 2.394 | 15.01 |
| 9 | 7.08 | 1.23031 | 4.16 | 4.140 | 17.48 |
| 10 | 5.56 | 0.12708 | 2.84 | 3.839 | 18.79 |

pH-stat controlled at 7.4

| Day | C3 OD | C5 OD | Mean OD | ln Mean OD | Biomass (g/L) | Volume | Biomass (g) | Std Dev | |
|-----|-------|-------|---------|------------|---------------|--------|-------------|---------|-------|
| 0 | 0.13 | 0.17 | 0.15 | 0.15 | 0 | 0.066 | 0.5 | 0.033 | 0.028 |
| 1 | 0.26 | 0.42 | 0.34 | 0.34 | 0.82 | 0.149 | 0.493 | 0.074 | 0.113 |
| 2 | 0.62 | 0.975 | 0.80 | 0.80 | 1.67 | 0.350 | 0.486 | 0.170 | 0.251 |
| 3 | 1.36 | 1.825 | 1.59 | 1.59 | 2.36 | 0.699 | 0.479 | 0.335 | 0.329 |
| 4 | 2.55 | 4.35 | 3.45 | 3.45 | 3.14 | 1.515 | 0.472 | 0.715 | 1.273 |
| 5 | 4.25 | 5.8 | 5.03 | 5.03 | 3.51 | 2.206 | 0.535 | 1.180 | 1.096 |
| 6 | 7.4 | 8.75 | 8.08 | 8.08 | 3.99 | 3.545 | 0.598 | 2.120 | 0.955 |
| 7 | 12 | 13 | 12.50 | 12.50 | 4.42 | 5.488 | 0.671 | 3.682 | 0.707 |
| 8 | 15 | 14 | 14.50 | 14.50 | 4.57 | 6.366 | 0.684 | 4.354 | 0.707 |
| 9 | 16.5 | 10 | 13.25 | 13.25 | 4.48 | 5.817 | 0.677 | 3.938 | 4.596 |
| 10 | 16 | 10 | 13.00 | 13.00 | 4.46 | 5.707 | 0.67 | 3.824 | 4.243 |

Td 0.87 day 21.0 h

pH-stat controlled at 7.4 log CFU/mL

| Day | C3 | C5 | C3 - log | C5 - log | Mean log | Std Dev | Mean CFU | Std Dev | |
|-----|----------|----------|----------|----------|----------|---------|----------|----------|----------|
| 0 | 1.20E+06 | 3.69E+06 | 6.08 | 6.08 | 6.57 | 6.32 | 0.345 | 2.45E+06 | 1.76E+06 |
| 1 | 3.41E+06 | 6.60E+06 | 6.53 | 6.53 | 6.82 | 6.68 | 0.203 | 5.00E+06 | 2.26E+06 |
| 2 | 7.69E+06 | 1.67E+07 | 6.89 | 6.89 | 7.22 | 7.05 | 0.238 | 1.22E+07 | 6.36E+06 |
| 3 | 1.37E+07 | 2.70E+07 | 7.14 | 7.14 | 7.43 | 7.28 | 0.209 | 2.03E+07 | 9.41E+06 |
| 4 | 2.26E+07 | 6.81E+07 | 7.35 | 7.35 | 7.83 | 7.59 | 0.339 | 4.54E+07 | 3.22E+07 |
| 5 | 5.04E+07 | 6.68E+07 | 7.70 | 7.70 | 7.82 | 7.76 | 0.087 | 5.86E+07 | 1.16E+07 |
| 6 | 5.62E+07 | 2.00E+08 | 7.75 | 7.75 | 8.30 | 8.03 | 0.390 | 1.28E+08 | 1.02E+08 |
| 7 | 8.01E+07 | 2.26E+08 | 7.90 | 7.90 | 8.35 | 8.13 | 0.318 | 1.53E+08 | 1.03E+08 |
| 8 | 9.50E+07 | 8.25E+08 | 7.98 | 7.98 | 8.92 | 8.45 | 0.664 | 4.60E+08 | 5.16E+08 |
| 9 | 2.55E+08 | 6.13E+08 | 8.41 | 8.41 | 8.79 | 8.60 | 0.269 | 4.34E+08 | 2.53E+08 |
| 10 | 3.03E+08 | | 8.48 | | | 8.48 | 0 | 3.03E+08 | |

pH-stat controlled at 7.4 Before freeze-drying

| Day | C3 | C5 | C3 - log | C5 - log | Mean log | Std Dev |
|-----|----------|----------|----------|----------|----------|---------|
| 5 | 9.88E+06 | 4.25E+07 | 6.99 | 7.63 | 7.31 | 0.448 |
| 6 | | 3.75E+07 | | 7.57 | 7.57 | 0.000 |
| 7 | 3.29E+07 | 1.06E+08 | 7.52 | 8.03 | 7.77 | 0.360 |
| 8 | | 3.46E+08 | | 8.54 | 8.54 | 0.000 |
| 9 | 6.38E+07 | 3.41E+08 | 7.80 | 8.53 | 8.17 | 0.515 |

pH-stat controlled at 7.4 After freeze-drying

| Day | C3 | C5 | C3 - log | C5 - log | Mean log | Std Dev |
|-----|----------|----------|----------|----------|----------|---------|
| 5 | 1.55E+07 | 7.50E+06 | 7.19 | 6.88 | 7.03 | 0.223 |
| 6 | | 7.67E+07 | | 7.88 | 7.88 | 0.000 |
| 7 | 3.30E+07 | 2.09E+07 | 7.52 | 7.32 | 7.42 | 0.141 |
| 8 | | 2.69E+07 | | 7.43 | 7.43 | 0.000 |
| 9 | 6.05E+07 | 3.44E+07 | 7.78 | 7.54 | 7.66 | 0.174 |

pH-stat controlled at 7.4 Substrate

| Day | C3 Glutamate (g/L) | C5 Glutamate (g/L) | Mean | Std Dev | Consumption |
|-----|-----------------------|-----------------------|------|---------|-------------|
| 0 | 2.200 | 2.500 | 2.35 | 0.21 | 0.00 |
| 1 | 2.180 | 2.238 | 2.21 | 0.04 | 0.14 |
| 2 | 2.040 | 1.905 | 1.97 | 0.10 | 0.38 |
| 3 | 1.636 | 1.298 | 1.47 | 0.24 | 0.88 |
| 4 | 1.148 | 0.545 | 0.85 | 0.43 | 1.50 |
| 5 | 0.958 | 0.220 | 0.59 | 0.52 | 1.76 |
| 6 | 0.628 | 0.040 | 0.33 | 0.42 | 2.02 |
| 7 | 0.076 | 0.013 | 0.04 | 0.04 | 2.31 |
| 8 | 0.010 | 0.005 | 0.01 | 0.00 | 2.34 |
| 9 | 0.004 | 0.005 | 0.00 | 0.00 | 2.35 |
| 10 | 0.000 | 0.000 | 0 | 0.00 | 2.35 |

pH-stat controlled at 7.4

| Day | C3 Glucose (g/L) | C5 Glucose (g/L) | Mean | Std Dev | Consumption |
|-----|---------------------|---------------------|-------|---------|-------------|
| 0 | 1.89014 | 1.44 | 1.667 | 0.315 | 0 |
| 1 | 1.84893 | 1.42 | 1.633 | 0.305 | 0.034 |
| 2 | 1.78168 | 1.37 | 1.576 | 0.290 | 0.091 |
| 3 | 1.76802 | 1.30 | 1.532 | 0.334 | 0.135 |
| 4 | 1.63524 | 0.67 | 1.153 | 0.682 | 0.514 |
| 5 | 1.61922 | 0.31 | 0.965 | 0.925 | 0.702 |
| 6 | 1.35542 | 0.00 | 0.678 | 0.958 | 0.989 |
| 7 | 1.05479 | 0.00 | 0.527 | 0.746 | 1.140 |
| 8 | 0.89738 | 0.00 | 0.449 | 0.635 | 1.218 |
| 9 | 0.82102 | 0.00 | 0.411 | 0.581 | 1.257 |
| 10 | 0.78298 | 0.00 | 0.391 | 0.554 | 1.276 |

pH-stat controlled at 7.4

| Day | C3 Glycerol (g/L) | C5 Glycerol (g/L) | Mean | Std Dev | Consumption |
|-----|----------------------|----------------------|-------|---------|-------------|
| 0 | 17.02422 | 26.33 | 21.68 | 6.58 | 0 |
| 1 | 16.79564 | 25.92 | 21.36 | 6.45 | 0.32 |
| 2 | 15.28984 | 25.59 | 20.44 | 7.28 | 1.24 |
| 3 | 14.93981 | 24.94 | 19.94 | 7.07 | 1.73 |
| 4 | 14.89501 | 19.09 | 16.99 | 2.96 | 4.68 |
| 5 | 13.14128 | 14.65 | 13.89 | 1.07 | 7.78 |
| 6 | 12.11434 | 8.04 | 10.08 | 2.88 | 11.60 |
| 7 | 8.78493 | 5.35 | 7.07 | 2.43 | 14.61 |
| 8 | 6.34697 | 0.00 | 3.17 | 4.49 | 18.50 |
| 9 | 4.12817 | 0.00 | 2.06 | 2.92 | 19.61 |
| 10 | 2.37572 | 0.00 | 1.19 | 1.68 | 20.49 |

Control (simple batch)

| Day | C1 OD | C9 OD | Mean OD | In mean OD | Biomass (g/L) | Biomass (g) | Produced biomass | Std Dev | |
|-----|-------|-------|---------|------------|---------------|-------------|------------------|---------|-------|
| 0 | | 0.17 | 0.26 | 0.22 | 0.00 | 0.09 | 0.05 | 0.00 | 0.06 |
| 1 | | 0.46 | 0.45 | 0.46 | 0.75 | 0.20 | 0.10 | 0.05 | 0.01 |
| 2 | | 0.94 | 1.15 | 1.05 | 1.58 | 0.46 | 0.23 | 0.18 | 0.15 |
| 3 | | 2 | 2.4 | 2.20 | 2.33 | 0.97 | 0.48 | 0.44 | 0.28 |
| 4 | | 4 | 4.5 | 4.25 | 2.98 | 1.87 | 0.93 | 0.89 | 0.35 |
| 5 | | 6.4 | 7.2 | 6.80 | 3.45 | 2.99 | 1.49 | 1.45 | 0.57 |
| 6 | | 9.2 | 10.5 | 9.85 | 3.82 | 4.32 | 2.16 | 2.11 | 0.92 |
| 7 | | 13.2 | 15.25 | 14.23 | 4.19 | 6.24 | 3.12 | 3.08 | 1.45 |
| 8 | | 19.5 | 23.5 | 21.50 | 4.61 | 9.44 | 4.72 | 4.67 | 2.83 |
| 9 | | 23 | 35 | 29.00 | 4.90 | 12.73 | 6.37 | 6.32 | 8.49 |
| 10 | | 28 | 40 | 34.00 | 5.06 | 14.93 | 7.46 | 7.42 | 8.49 |
| 11 | | 28 | 44 | 36.00 | 5.12 | 15.80 | 7.90 | 7.85 | 11.31 |

Td 0.92 day 22.2 h

Control (simple batch) log CFU/mL

| Day | C1 | C9 | log C1 | log C9 | Mean log | Std Dev | Mean UFC | Std Dev | |
|-----|----|----------|----------|--------|----------|---------|----------|----------|----------|
| 0 | | 2.95E+06 | 6.08E+06 | 6.47 | 6.78 | 6.63 | 0.222 | 4.51E+06 | 2.21E+06 |
| 1 | | 9.63E+06 | 1.55E+07 | 6.98 | 7.19 | 7.09 | 0.146 | 1.26E+07 | 4.15E+06 |
| 2 | | 1.64E+07 | 4.73E+07 | 7.22 | 7.68 | 7.45 | 0.325 | 3.19E+07 | 2.18E+07 |
| 3 | | 1.58E+07 | 5.94E+07 | 7.20 | 7.77 | 7.49 | 0.408 | 3.76E+07 | 3.08E+07 |
| 4 | | 4.31E+07 | 1.34E+08 | 7.63 | 8.13 | 7.88 | 0.348 | 8.84E+07 | 6.41E+07 |
| 5 | | 1.28E+08 | 1.41E+08 | 8.11 | 8.15 | 8.13 | 0.031 | 1.34E+08 | 9.72E+06 |
| 6 | | 1.55E+08 | 2.08E+08 | 8.19 | 8.32 | 8.25 | 0.091 | 1.82E+08 | 3.76E+07 |
| 7 | | 2.00E+08 | 3.28E+08 | 8.30 | 8.52 | 8.41 | 0.151 | 2.64E+08 | 9.02E+07 |
| 8 | | 1.89E+08 | 3.78E+08 | 8.28 | 8.58 | 8.43 | 0.213 | 2.83E+08 | 1.34E+08 |
| 9 | | 1.49E+08 | 4.73E+08 | 8.17 | 8.68 | 8.42 | 0.355 | 3.11E+08 | 2.30E+08 |
| 10 | | 1.96E+08 | 9.13E+07 | 8.29 | 7.96 | 8.13 | 0.235 | 1.44E+08 | 7.42E+07 |
| 11 | | 1.11E+08 | 1.11E+08 | 8.05 | 8.04 | 8.05 | 0.002 | 1.11E+08 | 4.42E+05 |

Control (simple batch) Before freeze-drying

| Day | C1 | C9 | log C1 | log C9 | Mean log | Std Dev | |
|-----|----------|----|----------|--------|----------|---------|-------|
| 5 | 7.08E+07 | | 5.75E+07 | 7.85 | 7.76 | 7.80 | 0.064 |
| 6 | | | 8.63E+07 | | 7.94 | 7.94 | 0.000 |
| 7 | 1.08E+08 | | 9.50E+07 | 8.03 | 7.98 | 8.00 | 0.038 |
| 8 | | | 1.19E+08 | | 8.07 | 8.07 | 0.000 |
| 9 | 8.25E+07 | | 9.63E+07 | 7.92 | 7.98 | 7.95 | 0.047 |
| 10 | | | 3.50E+07 | | 7.54 | 7.54 | 0.000 |
| 11 | 1.53E+08 | | 1.63E+07 | 8.18 | 7.21 | 7.70 | 0.688 |

Control (simple batch) After freeze-drying

| Day | C1 | C9 | log C1 | log C9 | Mean log | Std Dev | |
|-----|----------|----|----------|--------|----------|---------|-------|
| 5 | 5.05E+07 | | 6.75E+07 | 7.70 | 7.83 | 7.77 | 0.089 |
| 6 | | | 7.75E+07 | | 7.89 | 7.89 | 0.000 |
| 7 | 7.25E+07 | | 1.30E+08 | 7.86 | 8.11 | 7.99 | 0.179 |
| 8 | | | 1.14E+08 | | 8.06 | 8.06 | 0.000 |
| 9 | 6.50E+06 | | 8.13E+07 | 6.81 | 7.91 | 7.36 | 0.776 |
| 10 | | | 1.00E+07 | | 7.00 | 7.00 | 0.000 |
| 11 | 2.48E+06 | | 1.75E+06 | 6.39 | 6.24 | 6.32 | 0.106 |

Control (simple batch) Substrate

| | C1 | C9 | | | |
|-----|-----------------|-----------------|------|---------|-------------|
| Day | Glutamate (g/L) | Glutamate (g/L) | Mean | Std Dev | Consumption |
| 0 | 2.14 | 2.50 | 2.32 | 0.25 | 0.00 |
| 1 | 2.04 | 2.24 | 2.14 | 0.14 | 0.18 |
| 2 | 1.96 | 1.91 | 1.93 | 0.04 | 0.39 |
| 3 | 1.45 | 1.30 | 1.37 | 0.11 | 0.95 |
| 4 | 0.78 | 0.55 | 0.66 | 0.16 | 1.66 |
| 5 | 0.32 | 0.22 | 0.27 | 0.07 | 2.05 |
| 6 | 0.10 | 0.04 | 0.07 | 0.05 | 2.25 |
| 7 | 0.00 | 0.01 | 0.01 | 0.01 | 2.31 |
| 8 | 0.00 | 0.01 | 0.00 | 0.00 | 2.32 |
| 9 | 0.00 | 0.01 | 0.00 | 0.00 | 2.32 |
| 10 | 0.01 | 0.01 | 0.01 | 0.00 | 2.31 |
| 11 | 0.01 | 0 | 0.00 | 0.00 | 2.32 |

| | C1 | C9 | | | |
|-----|---------------|---------------|-------|---------|-------------|
| Day | Glucose (g/L) | Glucose (g/L) | Mean | Std Dev | Consumption |
| 0 | 1.61 | 2.85 | 2.230 | 0.871 | 0.000 |
| 1 | 1.56 | 2.73 | 2.144 | 0.829 | 0.085 |
| 2 | 1.58 | 2.23 | 1.906 | 0.463 | 0.324 |
| 3 | 1.57 | 2.19 | 1.877 | 0.441 | 0.353 |
| 4 | 1.42 | 1.40 | 1.408 | 0.012 | 0.822 |
| 5 | 1.42 | 0.88 | 1.153 | 0.380 | 1.077 |
| 6 | 0.92 | 0.13 | 0.525 | 0.558 | 1.705 |
| 7 | 0.40 | 0.00 | 0.202 | 0.286 | 2.027 |
| 8 | 0 | 0.00 | 0.000 | 0.000 | 2.230 |
| 9 | 0 | 0.00 | 0.000 | 0.000 | 2.230 |
| 10 | 0 | 0.00 | 0.000 | 0.000 | 2.230 |
| 11 | 0 | 0.00 | 0.000 | 0.000 | 2.230 |

Control (simple batch)

| Day | C1 Glycerol (g/L) | C9 Glycerol (g/L) | Mean | Std Dev | Consumption |
|-----|-------------------|-------------------|-------|---------|-------------|
| 0 | 25.71 | 20.40 | 23.05 | 3.75 | 0.00 |
| 1 | 24.97 | 16.98 | 20.97 | 5.65 | 2.08 |
| 2 | 25.30 | 16.94 | 21.12 | 5.91 | 1.93 |
| 3 | 25.77 | 15.62 | 20.70 | 7.17 | 2.36 |
| 4 | 25.14 | 15.44 | 20.29 | 6.86 | 2.76 |
| 5 | 24.58 | 14.67 | 19.62 | 7.01 | 3.43 |
| 6 | 21.56 | 13.69 | 17.62 | 5.57 | 5.43 |
| 7 | 17.17 | 12.71 | 14.94 | 3.16 | 8.11 |
| 8 | 12.57 | 10.30 | 11.43 | 1.60 | 11.62 |
| 9 | 7.34 | 6.47 | 6.91 | 0.61 | 16.14 |
| 10 | 3.48 | 6.09 | 4.78 | 1.85 | 18.27 |
| 11 | 0 | 1.97 | 0.99 | 1.39 | 22.07 |

| Day | Glutamate (g/L) | μ Monod (day-1) | error ² |
|-----|-----------------|---------------------|--------------------|
| 0 | 2.32 | 0.72 | 0.00 |
| 1 | 2.14 | 0.72 | 0.00 |
| 2 | 1.93 | 0.72 | 0.00 |
| 3 | 1.37 | 0.71 | 0.00 |
| 4 | 0.66 | 0.66 | 0.01 |
| 5 | 0.27 | 0.57 | 0.03 |
| 6 | 0.07 | 0.34 | 0.00 |
| 7 | 0.01 | 0.05 | |
| 8 | 0.00 | 0.04 | |
| 9 | 0.00 | 0.04 | |
| 10 | 0.01 | 0.06 | |
| 11 | 0.00 | 0.03 | |
| Sum | | | 0.05 |

| | |
|----------------------------|-------------|
| $\mu_{\text{m\acute{a}x}}$ | 0.75 |
| Ks | 0.085 |
| S: glutamato | |

Day-1
g/L

| Day | Glucose (g/L) | μ Monod (day-1) | error ² |
|-----|---------------|---------------------|--------------------|
| 0 | 2.229825 | 0.67 | 0.01 |
| 1 | 2.14 | 0.67 | 0.01 |
| 2 | 1.91 | 0.66 | 0.01 |
| 3 | 1.88 | 0.66 | 0.01 |
| 4 | 1.41 | 0.63 | 0.02 |
| 5 | 1.15 | 0.61 | 0.04 |
| 6 | 0.53 | 0.50 | 0.01 |
| 7 | 0.20 | 0.33 | |
| 8 | 0 | 0.00 | |
| 9 | 0 | 0.00 | |
| 10 | 0 | 0.00 | |
| 11 | 0 | 0.00 | |
| Sum | | | 0.11 |

| | |
|----------------------------|-------------|
| $\mu_{\text{m\acute{a}x}}$ | 0.75 |
| Ks | 0.26 |
| S: glicose | |

Day-1
g/L

Control (simple batch)

| Day | Glycerol (g/L) | μ Monod (day-1) | error ² |
|-----|----------------|---------------------|--------------------|
| 0 | 23.05 | 0.58 | 0.03 |
| 1 | 20.97 | 0.57 | 0.03 |
| 2 | 21.12 | 0.57 | 0.03 |
| 3 | 20.70 | 0.56 | 0.03 |
| 4 | 20.29 | 0.56 | 0.05 |
| 5 | 19.62 | 0.56 | 0.02 |
| 6 | 17.62 | 0.54 | 0.02 |
| 7 | 14.94 | 0.51 | 0.01 |
| 8 | 11.43 | 0.47 | 0.00 |
| 9 | 6.91 | 0.38 | 0.04 |
| 10 | 4.78 | 0.31 | 0.02 |
| 11 | 0.99 | 0.09 | 0.01 |
| Sum | | | 0.31 |

| | |
|--------------------|------|
| $\mu_{\text{máx}}$ | 0.75 |
| Ks | 6.9 |
| S: glicerol | |

Day-1
g/L