

Supplementary Table 3: Absolute intracellular concentrations of metabolites

Best estimates of concentrations of metabolites grown with glucose, glycerol, or acetate as the carbon source, with 95% confidence intervals of the concentrations in parentheses. The column "significance" provides information regarding whether the concentration differences between glucose, glycerol, and acetate-grown cells were statistically significant at a false discovery rate of 0.05; 1 = glucose and glycerol significantly different, 2 = glucose and acetate significantly different, 3 = glycerol and acetate significantly different.

	Glucose (M)	Glycerol (M)	Acetate (M)	Significance ^a
2,3-Dihydroxybenzoic acid	1.38E-4 (1.17E-4 to 1.64E-4)	4.14E-4 (2.91E-4 to 5.88E-4)	2.74E-4 (1.26E-4 to 5.97E-4)	1,2,3
3-phosphoglycerate ^b	1.54E-3 (1.51E-3 to 1.58E-3)	4.08E-3 (3.36E-3 to 4.95E-3)	1.51E-3 (1.02E-3 to 2.23E-3)	1,3
4-hydroxybenzoate	5.22E-5 (4.43E-5 to 6.15E-5)	7.87E-4 (3.67E-4 to 1.69E-3)	2.94E-4 (1.66E-4 to 5.19E-4)	1,2,3
6-phospho-D-gluconate	3.77E-3 (3.69E-3 to 3.85E-3)	4.00E-4 (2.46E-4 to 6.53E-4)	1.93E-4 (9.00E-5 to 4.14E-4)	1
acetoacetyl-CoA	2.18E-5 (1.37E-5 to 3.47E-5)			
acetyl-CoA	6.06E-4 (5.29E-4 to 6.94E-4)	7.34E-4 (3.32E-4 to 1.63E-3)	6.28E-4 (2.27E-4 to 1.74E-3)	1,2
acetylphosphate	1.07E-3 (1.02E-3 to 1.13E-3)	1.05E-3 (3.90E-4 to 2.80E-3)	1.56E-3 (1.20E-3 to 2.04E-3)	2
aconitate	1.61E-5 (1.38E-5 to 1.88E-5)	9.59E-5 (5.27E-5 to 1.74E-4)	7.23E-5 (3.66E-5 to 1.43E-4)	1,2,3
adenine	1.47E-6 (1.26E-6 to 1.71E-6)			
adenosine	1.31E-7 (9.44E-8 to 1.82E-7)			
adenosine-phosphosulfate	6.63E-6 (5.10E-6 to 8.62E-6)			
ADP	5.55E-4 (4.37E-4 to 7.04E-4)	1.49E-4 (9.81E-5 to 2.25E-4)	1.89E-4 (8.02E-5 to 4.47E-4)	
ADP-glucose	4.27E-6 (2.83E-6 to 6.44E-6)			
alanine	2.55E-3 (2.32E-3 to 2.80E-3)	1.77E-3 (1.49E-3 to 2.09E-3)	8.79E-4 (7.10E-4 to 1.09E-3)	1,2,3
α-ketoglutarate	4.43E-4 (3.12E-4 to 6.31E-4)	6.16E-4 (3.57E-4 to 1.06E-3)	4.46E-4 (2.65E-4 to 7.51E-4)	1
AMP	2.81E-4 (2.32E-4 to 3.41E-4)	1.56E-4 (9.41E-5 to 2.60E-4)	1.01E-4 (3.16E-5 to 3.25E-4)	1
anthranilate	3.48E-6 (3.34E-6 to 3.62E-6)	2.66E-6 (1.43E-6 to 4.93E-6)	3.44E-6 (2.63E-6 to 4.49E-6)	
arginine	5.69E-4 (4.79E-4 to 6.75E-4)			
asparagine	5.11E-4 (4.42E-4 to 5.92E-4)	9.70E-4 (6.09E-4 to 1.55E-3)	5.40E-4 (3.32E-4 to 8.80E-4)	1
aspartate	4.23E-3 (3.56E-3 to 5.04E-3)	9.30E-3 (6.45E-3 to 1.34E-2)	7.35E-3 (3.27E-3 to 1.65E-2)	1,2
ATP	9.63E-3 (8.13E-3 to 1.14E-2)	8.98E-3 (6.91E-3 to 1.17E-2)	4.14E-3 (2.79E-3 to 6.13E-3)	1,2,3
carbamyl-aspartate	5.90E-4 (3.64E-4 to 9.55E-4)	9.02E-5 (3.20E-5 to 2.54E-4)	2.66E-5 (6.33E-6 to 1.12E-4)	
citrate	1.96E-3 (1.10E-3 to 3.48E-3)	2.32E-3 (1.23E-3 to 4.37E-3)	2.19E-2 (1.75E-2 to 2.73E-2)	1,2,3

	Glucose (M)	Glycerol (M)	Acetate (M)	Significance ^a
citrulline	1.35E-3 (1.23E-3 to 1.48E-3)	9.31E-4 (6.24E-4 to 1.39E-3)	5.16E-4 (3.85E-4 to 6.90E-4)	1,2,3
CMP	3.60E-4 (1.87E-4 to 6.94E-4)			
coenzyme-A	1.37E-3 (8.83E-5 to 2.12E-2)	4.54E-3 (2.65E-4 to 7.78E-2)	3.70E-3 (2.17E-4 to 6.30E-2)	1,2,3
CTP	2.73E-3 (2.27E-3 to 3.27E-3)	1.40E-3 (5.64E-4 to 3.49E-3)	1.15E-3 (4.75E-4 to 2.77E-3)	1,2
cyclic-AMP	3.52E-5 (2.82E-5 to 4.39E-5)	8.30E-5 (3.04E-5 to 2.26E-4)	1.46E-4 (5.37E-5 to 3.98E-4)	1,2,3
cytidine	2.59E-6 (1.18E-6 to 5.67E-6)			
cytosine	1.41E-5 (8.65E-6 to 2.29E-5)			
dAMP	8.84E-6 (2.99E-6 to 2.62E-5)			
dATP	1.55E-5 (8.13E-6 to 2.96E-5)	5.10E-5 (2.50E-5 to 1.04E-4)	6.85E-5 (1.90E-5 to 2.46E-4)	1,2,3
dCTP	3.45E-5 (2.60E-5 to 4.57E-5)			
deoxyadenosine	2.82E-6 (1.80E-6 to 4.41E-6)			
deoxyguanosine	5.22E-7 (4.11E-7 to 6.62E-7)			
deoxyribose-5-P	3.03E-4 (4.82E-5 to 1.90E-3)			
dGMP	5.07E-5 (3.91E-5 to 6.58E-5)			
dihydroorotate	1.19E-5 (1.16E-5 to 1.23E-5)	4.58E-6 (3.34E-6 to 6.28E-6)	3.59E-6 (2.44E-6 to 5.28E-6)	1,2,3
dihydroxyacetone-phosphate	3.74E-4 (3.44E-4 to 4.05E-4)	5.44E-4 (3.72E-4 to 7.95E-4)	1.47E-4 (6.74E-5 to 3.19E-4)	1
dTDP	3.78E-4 (3.37E-4 to 4.26E-4)			
dTTP	4.62E-3 (4.21E-3 to 5.08E-3)	5.25E-4 (3.84E-4 to 7.17E-4)	6.67E-4 (5.56E-4 to 8.01E-4)	2
FAD	1.73E-4 (9.33E-5 to 3.19E-4)	2.09E-4 (4.23E-5 to 1.04E-3)	4.93E-5 (6.56E-6 to 3.71E-4)	1,3
flavin mononucleotide	5.37E-5 (3.84E-5 to 7.51E-5)	2.74E-6 (5.30E-7 to 1.42E-5)	5.31E-5 (1.27E-5 to 2.23E-4)	2,3
fructose-1,6-bisphosphate	1.52E-2 (1.40E-2 to 1.64E-2)	5.85E-3 (4.19E-3 to 8.16E-3)	<1.52E-4	1,2,3
fumarate	1.15E-4 (3.00E-6 to 4.42E-3)	2.55E-4 (6.58E-6 to 9.92E-3)	2.67E-4 (6.73E-6 to 1.06E-2)	1,2
GDP	6.76E-4 (4.99E-4 to 9.16E-4)	2.32E-5 (5.73E-6 to 9.40E-5)	1.77E-5 (4.64E-6 to 6.74E-5)	
gluconate	4.16E-5 (5.74E-6 to 3.02E-4)			
gluconolactone	1.04E-3 (6.47E-4 to 1.68E-3)			
glucosamine-6_phosphate	1.15E-3 (9.59E-4 to 1.39E-3)	3.78E-4 (9.94E-5 to 1.44E-3)	3.16E-4 (2.18E-4 to 4.58E-4)	
glutamate	9.60E-2 (9.24E-2 to 9.98E-2)	1.49E-1 (1.33E-1 to 1.68E-1)	4.48E-2 (3.26E-2 to 6.14E-2)	1,3
glutamine	3.81E-3 (3.50E-3 to 4.15E-3)	4.95E-3 (4.35E-3 to 5.63E-3)	3.06E-3 (2.62E-3 to 3.57E-3)	1,2,3
glutathione	1.66E-2 (1.53E-2 to 1.79E-2)	1.76E-2 (1.51E-2 to 2.06E-2)	7.97E-3 (5.49E-3 to 1.16E-2)	1,3
glutathione disulfide	2.37E-3 (1.94E-3 to 2.90E-3)	7.31E-3 (2.87E-3 to 1.86E-2)	1.68E-3 (8.67E-4 to 3.26E-3)	1,3

	Glucose (M)	Glycerol (M)	Acetate (M)	Significance ^a
glycerate	1.41E-3 (6.44E-4 to 3.08E-3)			
glycerolphosphate	4.90E-5 (1.29E-5 to 1.87E-4)	8.13E-4 (1.82E-4 to 3.63E-3)	2.46E-4 (4.94E-5 to 1.23E-3)	1,2,3
GMP	2.37E-5 (1.66E-5 to 3.38E-5)			
GTP	4.87E-3 (1.57E-3 to 1.51E-2)	2.69E-3 (7.03E-4 to 1.03E-2)	1.25E-3 (3.64E-4 to 4.28E-3)	
guanine	1.88E-4 (1.32E-4 to 2.69E-4)	3.31E-6 (1.22E-6 to 9.00E-6)	< 3.31E-6	2,3
guanosine	1.62E-6 (1.22E-6 to 2.17E-6)			
hexose-P ^c	8.75E-3 (8.43E-3 to 9.08E-3)	5.48E-3 (4.43E-3 to 6.79E-3)	4.36E-3 (3.51E-3 to 5.42E-3)	1,2
histidine	6.76E-5 (4.58E-5 to 9.97E-5)	1.75E-4 (9.78E-5 to 3.13E-4)	9.75E-5 (4.39E-5 to 2.17E-4)	1,3
histidinol	1.28E-5 (1.26E-5 to 1.30E-5)	1.92E-5 (2.99E-6 to 1.23E-4)	1.96E-5 (8.90E-6 to 4.31E-5)	
homocysteine	3.70E-4 (3.65E-4 to 3.75E-4)			
inosine-diphosphate	2.38E-5 (1.76E-5 to 3.22E-5)			
inosine-monophosphate	2.72E-4 (1.73E-4 to 4.26E-4)			
inosine-triphosphate	2.05E-4 (1.38E-4 to 3.03E-4)			
isoleucine+leucine	3.03E-4 (2.98E-4 to 3.08E-4)	4.38E-4 (3.50E-4 to 5.48E-4)	3.41E-4 (2.82E-4 to 4.13E-4)	1,2,3
lysine	4.05E-4 (3.27E-4 to 5.02E-4)	7.62E-4 (5.51E-4 to 1.06E-3)	5.54E-4 (4.14E-4 to 7.43E-4)	1,2,3
malate	1.68E-3 (1.66E-3 to 1.70E-3)	3.45E-3 (3.07E-3 to 3.89E-3)	3.33E-3 (2.95E-3 to 3.76E-3)	1,2,3
malonyl-CoA	3.54E-5 (4.05E-7 to 3.09E-3)			
methionine	1.45E-4 (1.31E-4 to 1.61E-4)	1.29E-4 (9.87E-5 to 1.68E-4)	6.59E-5 (4.38E-5 to 9.92E-5)	1
myo-inositol	5.72E-6 (4.22E-6 to 7.75E-6)	7.05E-6 (4.26E-6 to 1.17E-5)	6.90E-6 (3.92E-6 to 1.22E-5)	
N-acetyl-glucosamine-1P	8.19E-5 (7.25E-5 to 9.26E-5)			
N-acetyl-ornithine	4.33E-5 (2.71E-5 to 6.94E-5)	3.98E-4 (9.18E-5 to 1.72E-3)	1.52E-4 (4.31E-5 to 5.35E-4)	1,2,3
NAD	2.55E-3 (2.32E-3 to 2.80E-3)	4.08E-3 (1.28E-3 to 1.30E-2)	2.43E-3 (1.11E-3 to 5.33E-3)	1,2
NADH	8.32E-5 (5.45E-5 to 1.27E-4)	1.29E-4 (1.94E-5 to 8.55E-4)	1.35E-4 (7.91E-5 to 2.31E-4)	1,2
NADP+	2.08E-6 (1.40E-7 to 3.11E-5)			
NADPH	1.21E-4 (1.10E-4 to 1.34E-4)	2.88E-4 (4.04E-5 to 2.05E-3)	2.98E-4 (5.22E-5 to 1.70E-3)	1
ornithine	1.01E-5 (6.81E-6 to 1.51E-5)	3.03E-5 (8.47E-6 to 1.08E-4)	6.40E-5 (3.42E-5 to 1.20E-4)	1,2,3
pentose-P ^d	1.32E-3 (9.83E-4 to 1.77E-3)	1.02E-3 (6.83E-4 to 1.52E-3)	6.86E-4 (4.44E-4 to 1.06E-3)	2
phenylalanine	1.82E-5 (1.77E-5 to 1.87E-5)	4.21E-5 (3.38E-5 to 5.25E-5)	2.74E-5 (2.03E-5 to 3.70E-5)	1,2,3
phenylpyruvate	8.98E-5 (5.01E-5 to 1.61E-4)	1.95E-4 (1.00E-4 to 3.79E-4)	1.48E-4 (1.54E-5 to 1.42E-3)	1,2,3
phosphoenolpyruvate	1.84E-4 (1.46E-4 to 2.31E-4)	1.34E-3 (1.04E-3 to 1.73E-3)	9.09E-4 (6.59E-4 to 1.25E-3)	1,2,3

	Glucose (M)	Glycerol (M)	Acetate (M)	Significance ^a
proline	3.85E-4 (3.72E-4 to 3.99E-4)	4.51E-4 (4.03E-4 to 5.05E-4)	3.61E-4 (3.10E-4 to 4.21E-4)	1,2,3
propionyl-CoA	5.32E-6 (3.88E-6 to 7.29E-6)			
PRPP	2.58E-4 (1.36E-4 to 4.92E-4)	1.53E-4 (7.88E-5 to 2.97E-4)	9.44E-5 (4.84E-5 to 1.84E-4)	1,2
quinolinate	1.15E-5 (2.41E-6 to 5.49E-5)	4.66E-6 (9.11E-7 to 2.38E-5)	8.96E-7 (1.52E-7 to 5.28E-6)	
riboflavin	1.90E-5 (1.72E-5 to 2.11E-5)	2.21E-5 (1.40E-5 to 3.48E-5)	1.88E-5 (1.35E-5 to 2.61E-5)	1,2
S-adenosyl-L-methionine	1.84E-4 (1.19E-4 to 2.84E-4)	1.10E-3 (3.85E-4 to 3.16E-3)	3.88E-4 (1.28E-4 to 1.18E-3)	1,2,3
serine	6.80E-5 (2.57E-5 to 1.80E-4)	1.50E-4 (5.26E-5 to 4.27E-4)	9.55E-5 (3.54E-5 to 2.58E-4)	1,2,3
shikimate	1.41E-5 (7.02E-6 to 2.81E-5)			
succinate	5.69E-4 (3.41E-4 to 9.49E-4)	1.14E-3 (6.26E-4 to 2.09E-3)	9.23E-4 (3.90E-4 to 2.19E-3)	1
succinyl-CoA	2.33E-4 (1.42E-4 to 3.83E-4)	1.44E-3 (3.15E-4 to 6.61E-3)	3.90E-4 (9.88E-5 to 1.54E-3)	1,2,3
threonine	1.79E-4 (1.74E-4 to 1.85E-4)			
tryptophan	1.21E-5 (1.14E-5 to 1.29E-5)	2.36E-5 (1.87E-5 to 2.98E-5)	2.05E-5 (1.26E-5 to 3.33E-5)	1,2
tyrosine	2.89E-5 (1.87E-5 to 4.47E-5)	8.74E-5 (4.89E-5 to 1.56E-4)	5.22E-5 (2.82E-5 to 9.64E-5)	1,2,3
UDP	1.79E-3 (1.18E-3 to 2.72E-3)			
UDP-glucuronate	5.66E-4 (1.20E-4 to 2.67E-3)	3.75E-4 (7.88E-5 to 1.79E-3)	1.88E-4 (3.93E-5 to 8.98E-4)	1,2,3
UDP-glucose	2.50E-3 (1.23E-3 to 5.11E-3)	1.12E-3 (5.39E-4 to 2.32E-3)	5.53E-4 (2.63E-4 to 1.16E-3)	1,2,3
UDP-N-acetyl-glucosamine	9.24E-3 (6.79E-3 to 1.26E-2)	4.11E-3 (2.93E-3 to 5.77E-3)	2.40E-3 (1.67E-3 to 3.43E-3)	1,2,3
uridine	2.09E-3 (1.96E-3 to 2.24E-3)			
UTP	8.29E-3 (7.76E-3 to 8.86E-3)	3.99E-3 (3.49E-3 to 4.56E-3)	2.37E-3 (1.85E-3 to 3.05E-3)	1,2,3
valine	4.02E-3 (3.53E-3 to 4.58E-3)	2.29E-3 (1.70E-3 to 3.08E-3)	1.07E-3 (8.17E-4 to 1.41E-3)	1,2

^a1 denotes a significant difference in concentration between glucose and glycerol cultures, 2 between glucose and acetate cultures, and 3 between glycerol and acetate cultures.

^b3-phosphoglycerate concentration may be overestimated due to degradation of 1,3-diphosphoglycerate to 3-phosphoglycerate during sample handling.

^chexose-P denotes the combined pools of fructose-6-phosphate, glucose-6-phosphate and glucose-1-phosphate (112)

^dpentose-P denotes the combined pools of ribose-5-phosphate, ribulose-5-phosphate, and xylulose-5-phosphate