Escherichia coli K-12 substr. MG1655 Growth Medium: M9 medium with 0.4% glucose

See All Growth Media

Summary:

M9 medium is a defined, minimal medium for *E. coli*. It is one of the simplest media in common use, providing a bare-bones complement of phosphorous, nitrogen, and sulfur. It is the medium of choice for microscopy of *E. coli* as it generates significantly less autofluorescence than other commonly used media such as LB [Xiao07].

This entry describes M9 medium with .4% glucose as the carbon source.

Citations: [Maniatis82]

Recipe Substances:

Substances	Concentration	Role
disodium phosphate heptahydrate	12.8 g/l	Source of P
β-D-glucose	4.0 g/l	Source of C
monopotassium phosphate	3.0 g/l	Source of P
ammonium chloride	1.0 g/l	Source of N
sodium chloride	0.5 g/l	
magnesium sulfate	2.0 mM	Source of S

Composition:

Constituents	Concentration
Na^+	103.70 mM
phosphate	69.45 mM
chloride	27.25 mM
β-D-glucose	22.20 mM
K^+	21.88 mM
ammonium	18.69 mM
Mg^{2+}	2.00 mM
sulfate	2.00 mM

pH: 7.2

Osmolarity (approximate, computed from constituents): 0.27 Osm/L

Wildtype growth observations:

T (°C)	O_2	Growth?
37	Aerobic	Yes

Single gene knockouts exhibiting no growth (aerobic):

argA , argB , argC , argE , argG , argH , aroA , aroB , aroC , aroD , aroE , bioA , bioB , bioC , bioD , bioF , bioH , carA , carB , cysB , cysC , cysD , cysE , cysG , cysH , cysI , cysJ , cysN , fes , glnA , gltA , glyA , guaA , guaB , hisA , hisB , hisC , hisD , hisF , hisG (T=37°C) [Patrick07, Comment 1] + 67 more... [Show All]

Fig. S1 : An EcoCyc growth medium page.

Growth Medium	Growth?	T (°C)	O_2	pH	Osm/L	Growth Observations
LB enriched	Yes	37	Aerobic	6.95		Yes [Gerdes03, Comment 1]
LB Lennox	Yes	37	Aerobic	7		Yes [Baba06, Comment 2]
M9 medium with 0.4% glucose	No	37	Aerobic	7.2	0.27	No [Patrick07, Comment 3]
M9 medium with 1% glycerol	No	37	Aerobic	7.2	0.35	No [Joyce06]
MOPS medium with 0.4% glucose	Indeterminate	37	Aerobic	7.2	0.21	No [Feist07, Comment 4] Yes [Baba06, Comment 2]

Fig. S2 : An EcoCyc-generated table listing growth observation data for *aroC* knockouts.

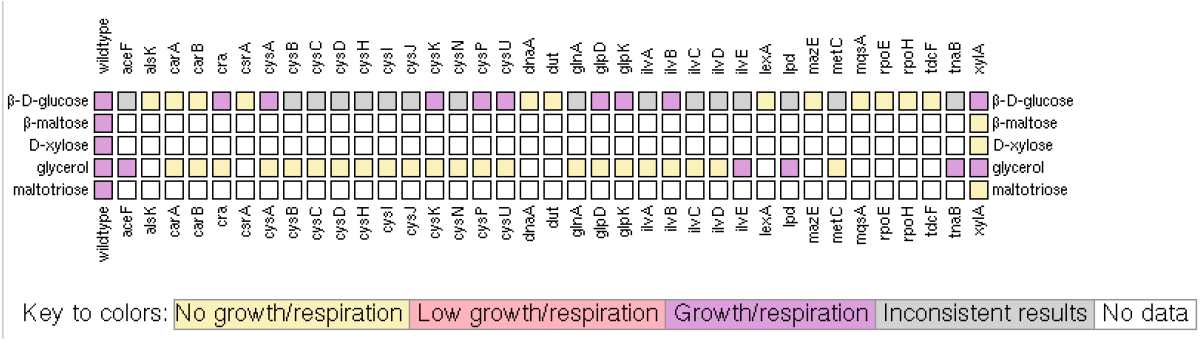
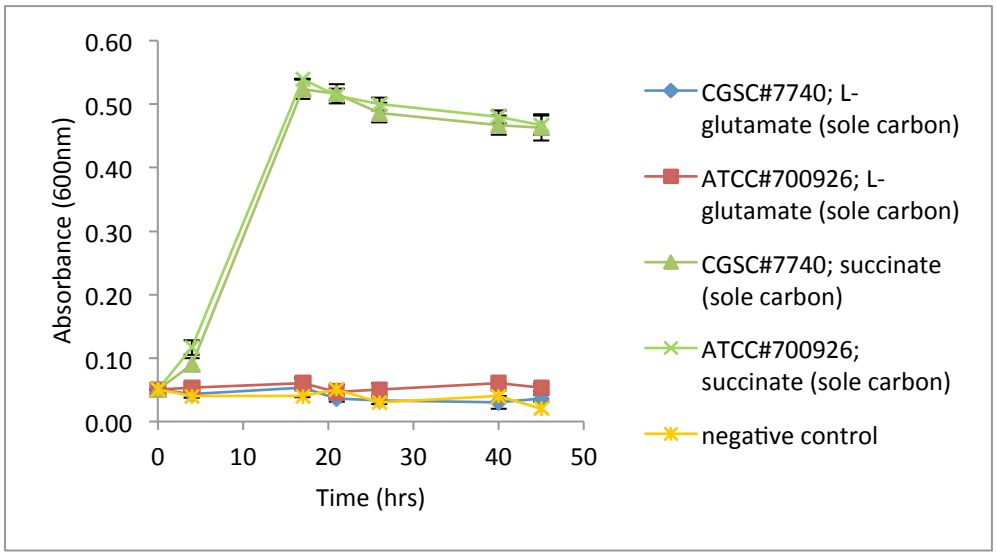


Fig. S3 : EcoCyc-generated Heatmap showing those degradation-pathway-related genes (including direct and indirect regulators, and genes in the same operon as genes in degradation pathways) whose knockouts behave differently than wildtype on one or more carbon sources for which data is available. Note that data for carbon sources other than glucose or glycerol is only available for the xylA gene. Mousing over any box in the EcoCyc.org version of this diagram shows the individual growth observations and their sources for that box.

(A)



(B)

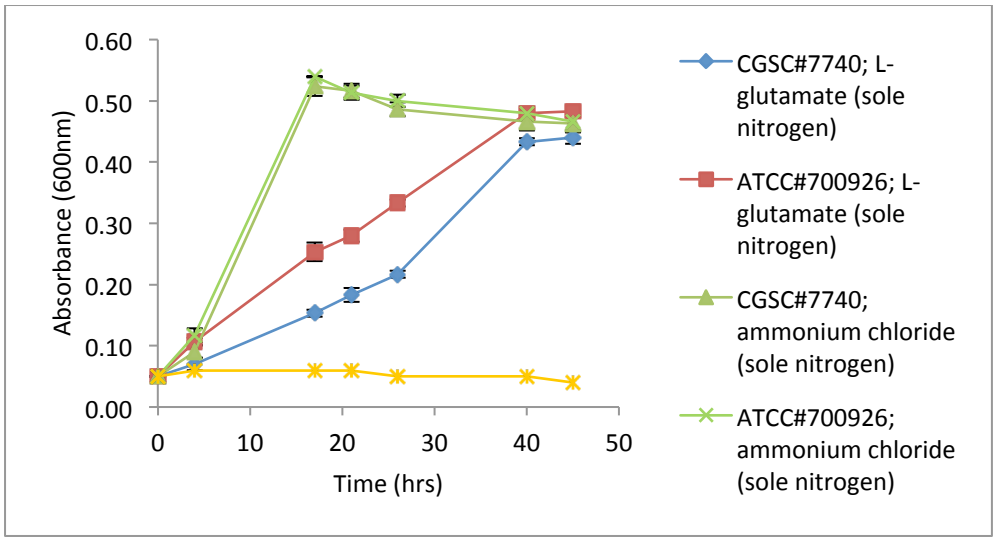
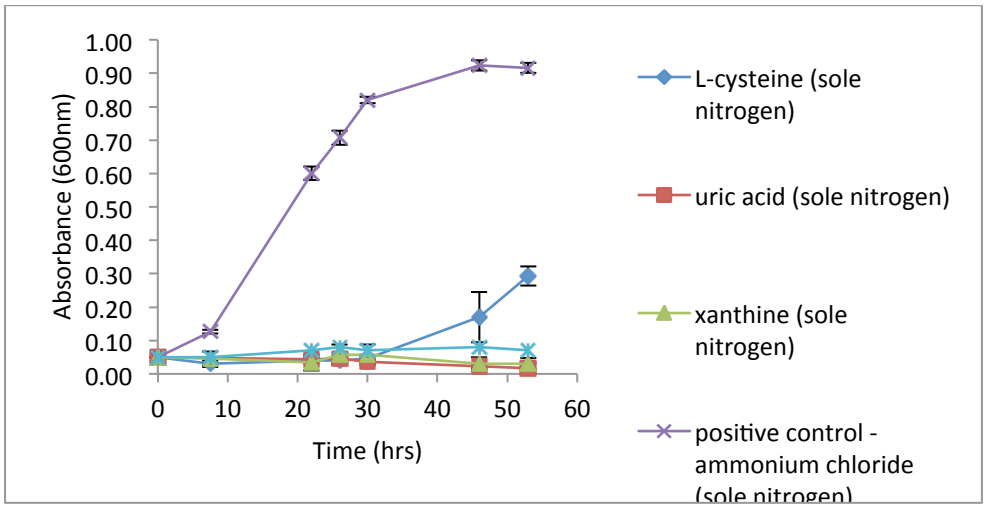
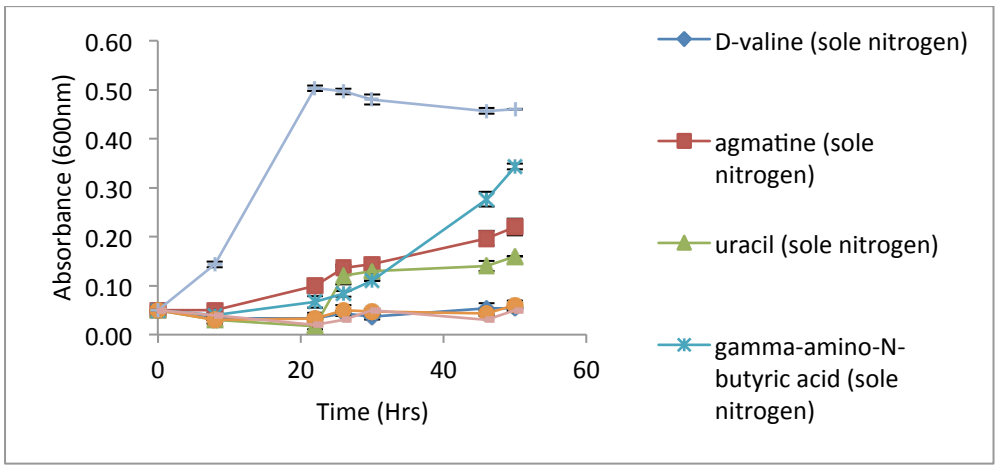


Fig. S4 : Growth of two stock cultures of *E. coli* K-12 MG1655 with L-glutamate supplied as **(A)** the sole carbon source or **(B)** the sole nitrogen source. For the carbon source assays, ammonium chloride at a final concentration of 0.5% (w/v) was supplied as the nitrogen source; for nitrogen source assays, sodium succinate at a final concentration of 0.5% (w/v) was supplied as the carbon source. In both assays L-glutamate was supplied at a concentration of 0.5% (w/v).

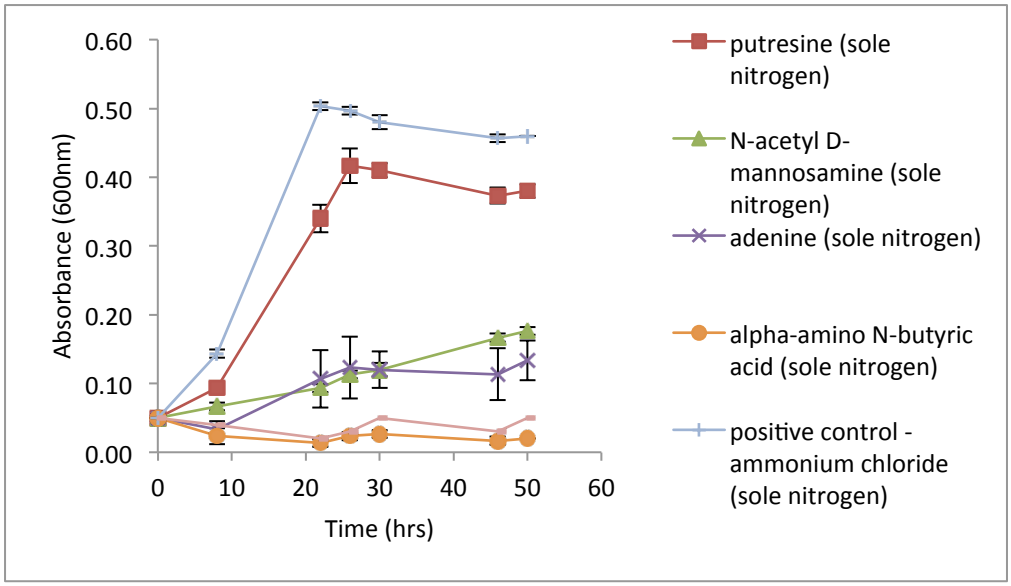
(A)


Absorbance (600nm)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
10
20
30
40
50
60
Time (hrs)
L-cysteine (sole nitrogen)
uric acid (sole nitrogen)
xanthine (sole nitrogen)
positive control - ammonium chloride (sole nitrogen)

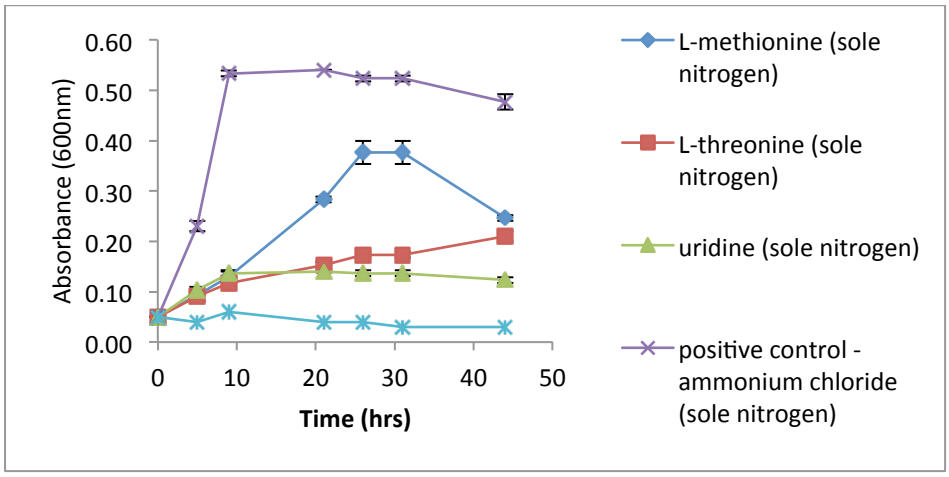
(B)


Absorbance (600nm)
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
20
40
60
Time (Hrs)
D-valine (sole nitrogen)
agmatine (sole nitrogen)
uracil (sole nitrogen)
gamma-amino-N-butyric acid (sole nitrogen)

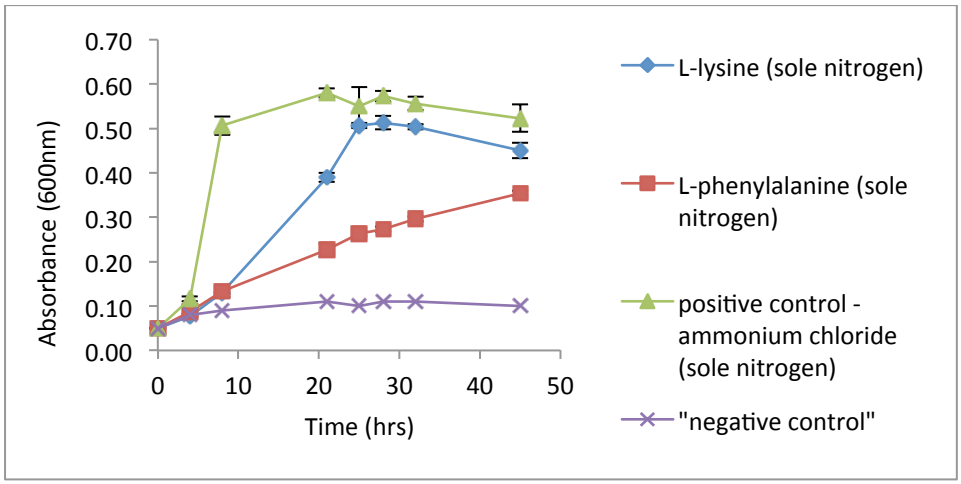
(C)


Absorbance (600nm)
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
10
20
30
40
50
60
Time (hrs)
putresine (sole nitrogen)
N-acetyl D-mannosamine (sole nitrogen)
adenine (sole nitrogen)
alpha-amino N-butyric acid (sole nitrogen)
positive control - ammonium chloride (sole nitrogen)

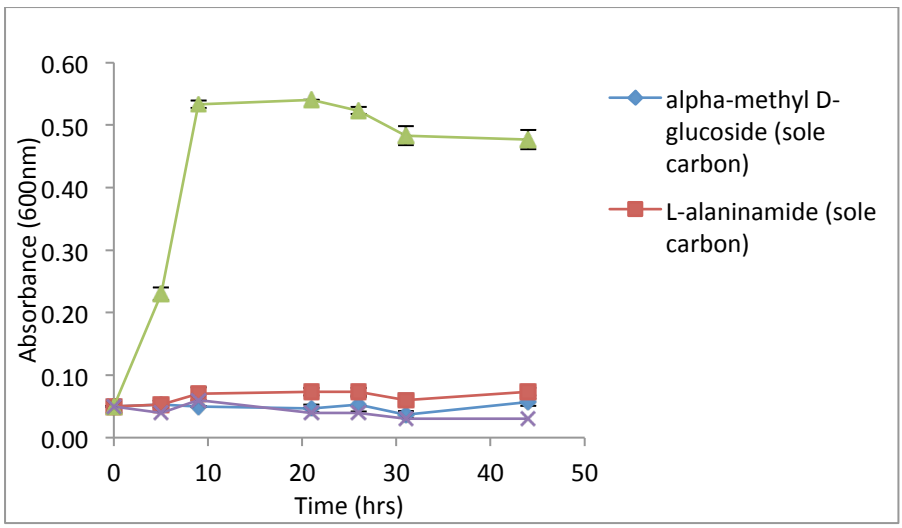
(D)


0.60
0.50
0.40
0.30
0.20
0.10
0.00
Absorbance (600nm)
0
10
20
30
40
50
Time (hrs)
L-methionine (sole nitrogen)
L-threonine (sole nitrogen)
uridine (sole nitrogen)
positive control - ammonium chloride (sole nitrogen)

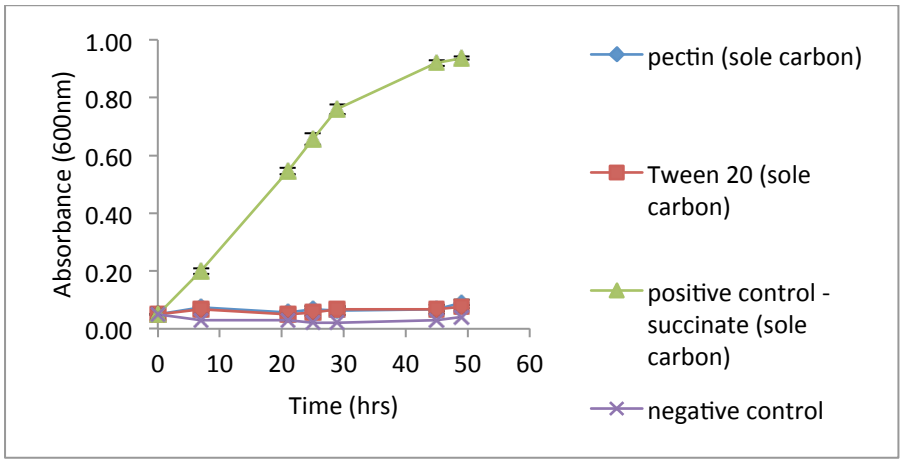
(E)


0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Absorbance (600nm)
0
10
20
30
40
50
Time (hrs)
L-lysine (sole nitrogen)
L-phenylalanine (sole nitrogen)
positive control - ammonium chloride (sole nitrogen)
"negative control"

(F)


0.60
0.50
0.40
0.30
0.20
0.10
0.00
Absorbance (600nm)
0
10
20
30
40
50
Time (hrs)
alpha-methyl D-glucoside (sole carbon)
L-alaninamide (sole carbon)

(G)



(H)

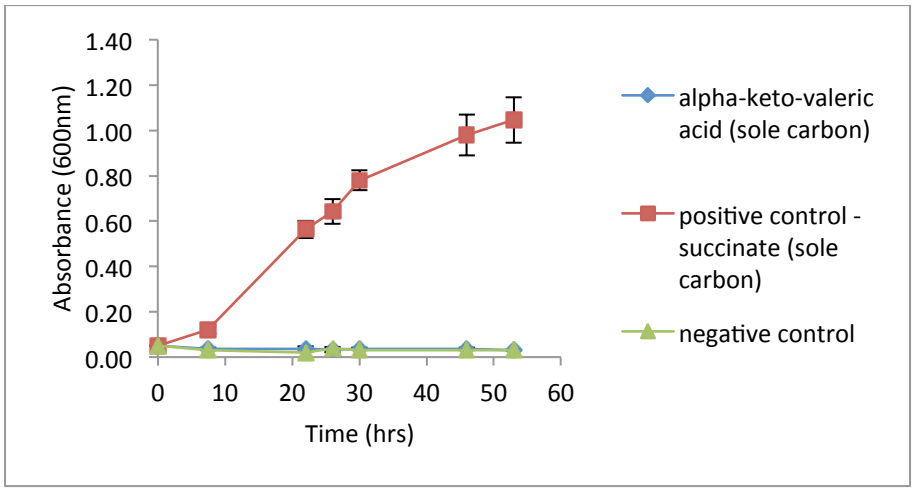
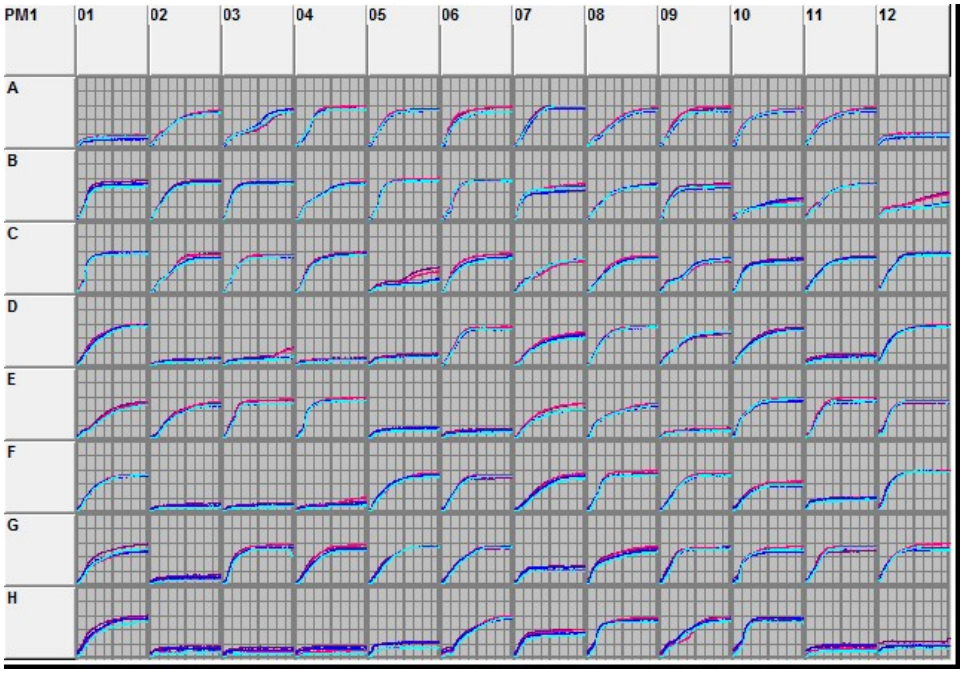
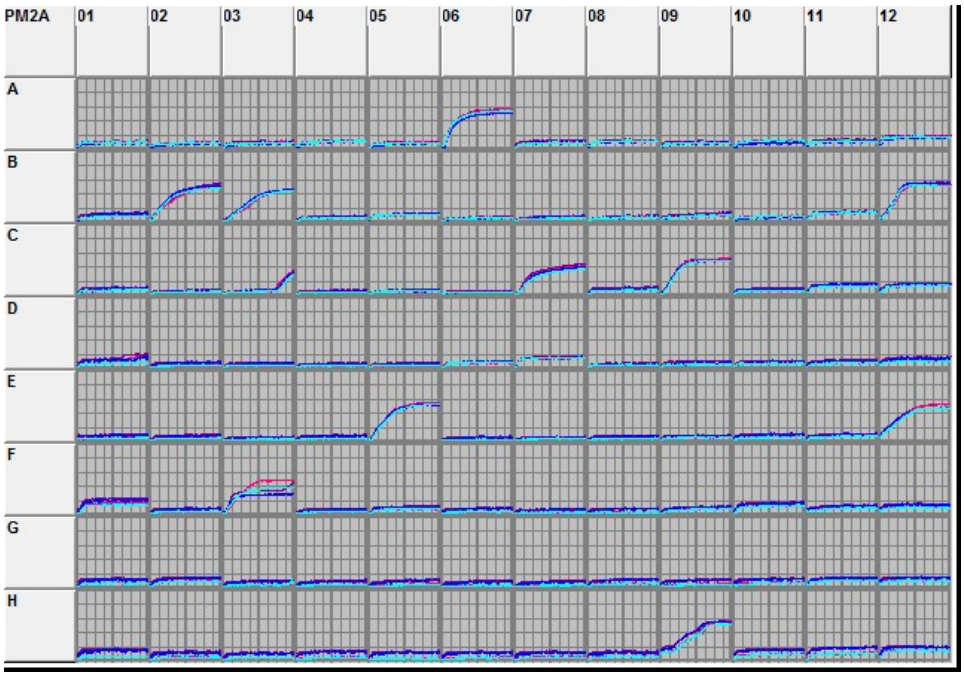


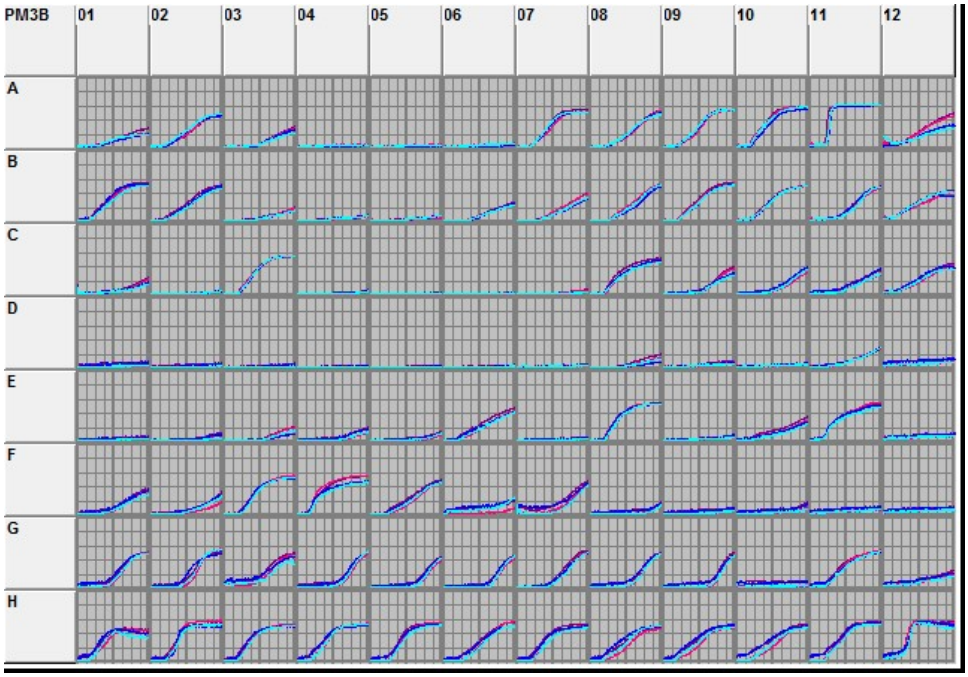
Figure S5 : Growth of *E. coli* K-12 MG1655 with various sole carbon or nitrogen sources:

(A) L-cysteine, uric acid and xanthine supplied as the sole nitrogen source; **(B)** D-valine, agmatine, uracil, γ-amino-N-butyric acid and alloxan supplied as the sole nitrogen source; **(C)** putrescine, N-acetyl D-mannosamine, adenine and α-amino-N-butyric acid supplied as the sole nitrogen source; **(D)** L-methionine, L-threonine and uridine supplied as the sole nitrogen source; **(E)** L-lysine and L-phenylalanine supplied as the sole nitrogen source; **(F)** α-methyl-D-glucoside and L-alaninamide supplied as the sole carbon source; **(G)** pectin and Tween-20 supplied as the sole carbon source; **(H)** α-keto-valeric acid supplied as the sole carbon source.

For nitrogen source assays, sodium succinate at a final concentration of 0.2% (w/v) was supplied as the carbon source. For carbon source assays, ammonium chloride at a final concentration of 0.2% (w/v) was supplied as the nitrogen source. All test compounds were supplied at a final concentration of 0.2% (w/v)


PM1
01
02
03
04
05
06
07
08
09
10
11
12
A
B
C
D
E
F
G
H


PM2A
01
02
03
04
05
06
07
08
09
10
11
12
A
B
C
D
E
F
G
H



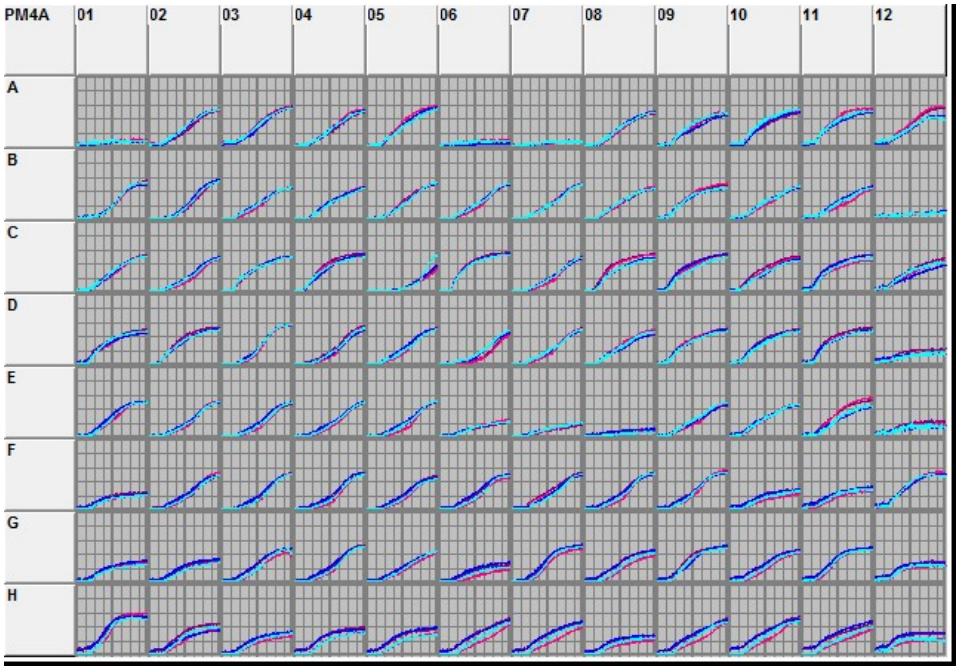
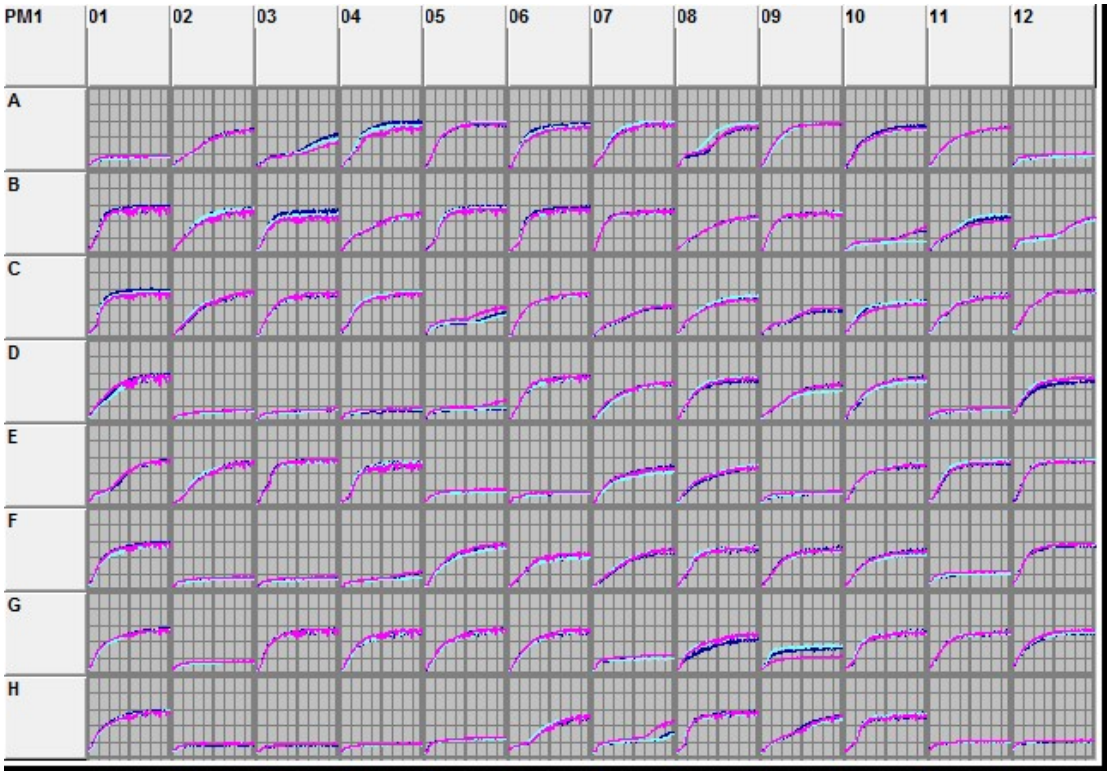


Fig. S6: Comparison of two *E. coli* K-12 MG1655 stock cultures on Biolog PM assay plates 1-4 (plate identification is in upper left of each plate). Assays were run in duplicate for each stock culture – results for ATCC#700926 are coloured red and purple; results for CGSC#7740 are coloured dark and light blue. L-glutamate is supplied as sole carbon source in well B12 of PM1 and as sole nitrogen source in well A12 of PM3.



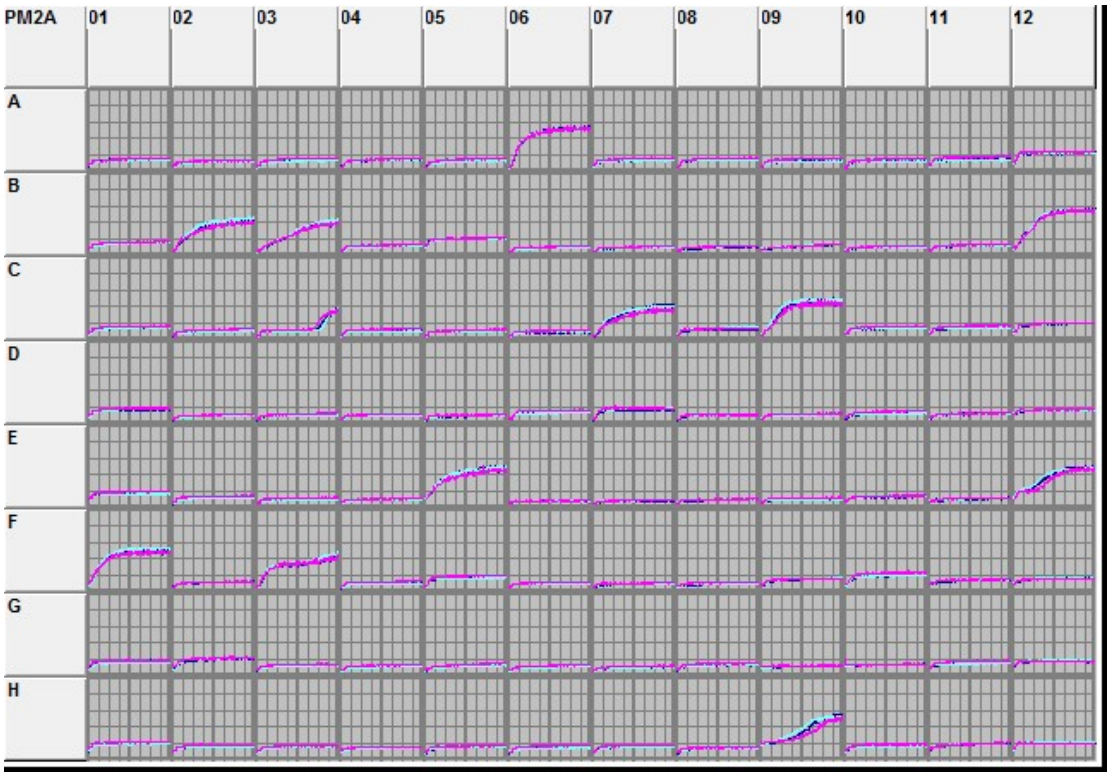


Figure S7: Biolog kinetic response curves generated under varying pre-growth conditions for carbon source plates PM1 and PM2A. LB agar – dark blue; R2A agar – light blue; BUG-S agar – red.