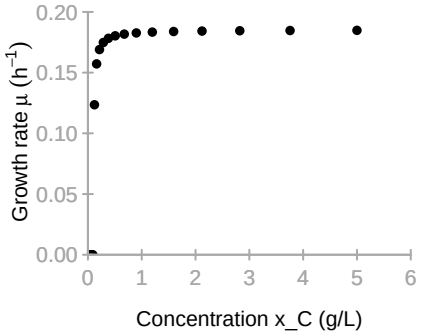
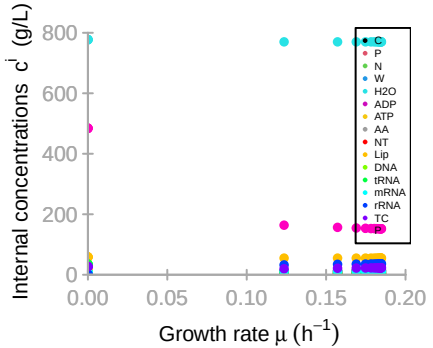
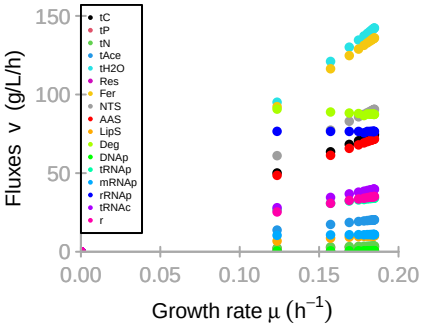
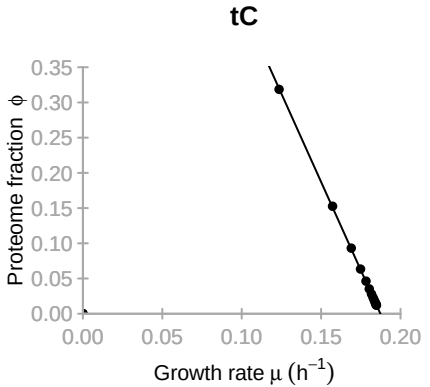
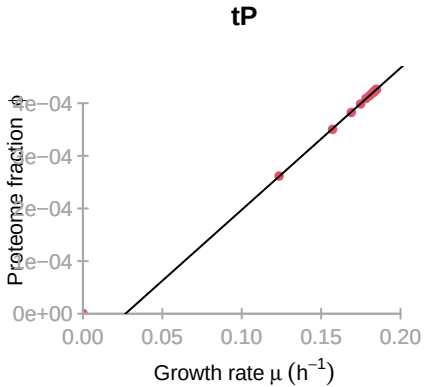
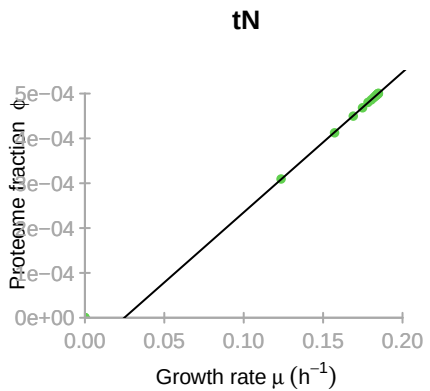

Growth rate μ (h−1)
0.20
0.15
0.10
0.05
0.00
0
1
2
3
4
5
6
Concentration x_C (g/L)

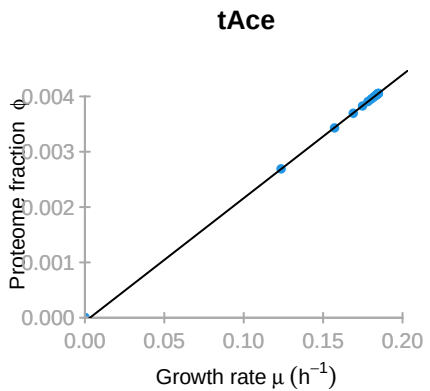

Internal concentrations ci (g/L)
800
600
400
200
0
0.00
0.05
0.10
0.15
0.20
Growth rate μ (h−1)
C
P
N
W
H2O
ADP
ATP
AA
NT
Lip
DNA
tRNA
mRNA
rRNA
TC
TR

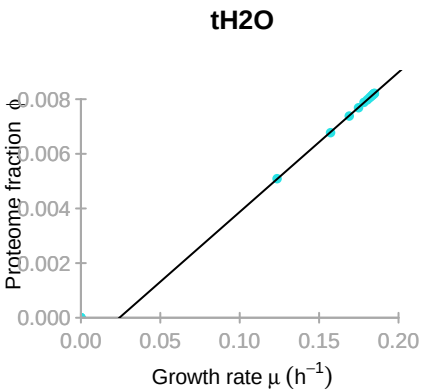

Fluxes v (g/L/h)
150
100
50
0
0.00
0.05
0.10
0.15
0.20
Growth rate μ (h−1)
tC
tP
tN
tAce
tH2O
Res
Fer
NTS
AAS
LipS
Deg
DNAp
tRNAp
mRNAp
rRNAp
tRNAc
r

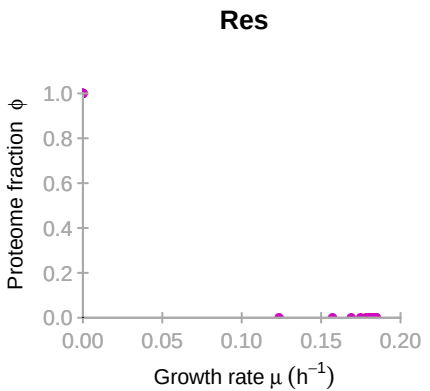

tC
Proteome fraction ϕ
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.05
0.10
0.15
0.20
Growth rate μ (h−1)

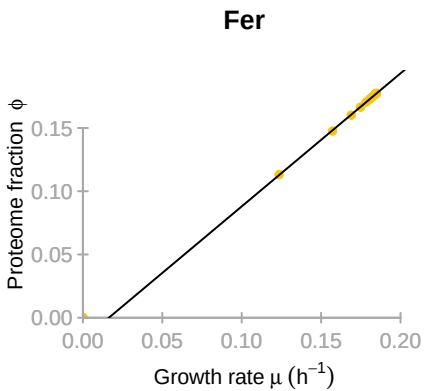

tP
Proteome fraction ϕ
0e+00
0.00
0.05
0.10
0.15
0.20
Growth rate μ (h−1)

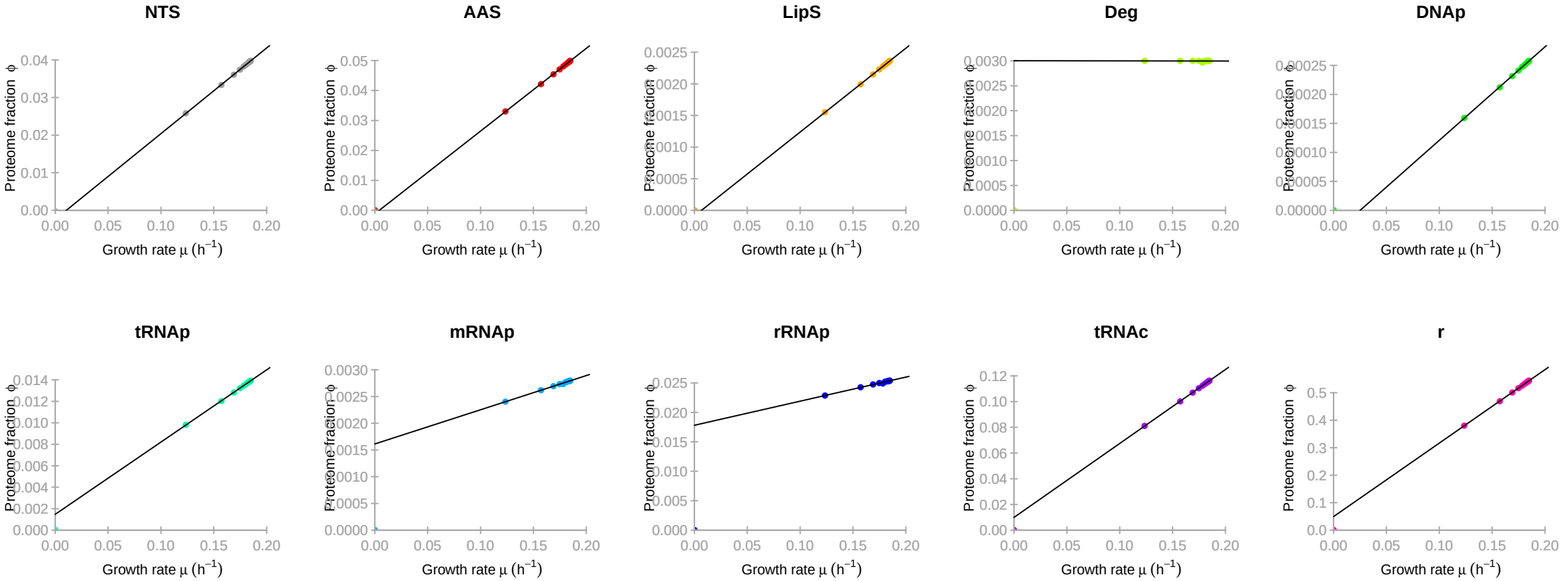

tN
Proteome fraction ϕ
0e+00
0.00
0.05
0.10
0.15
0.20
Growth rate μ (h−1)

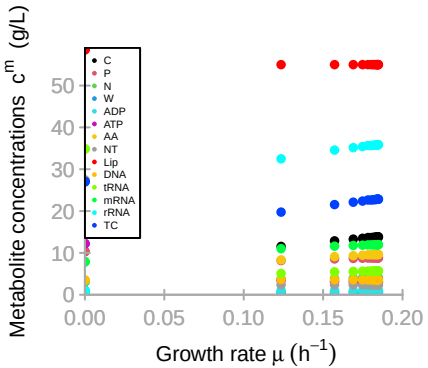

tAce
Proteome fraction ϕ
0.004
0.003
0.002
0.001
0.000
0.00
0.05
0.10
0.15
0.20
Growth rate μ (h−1)

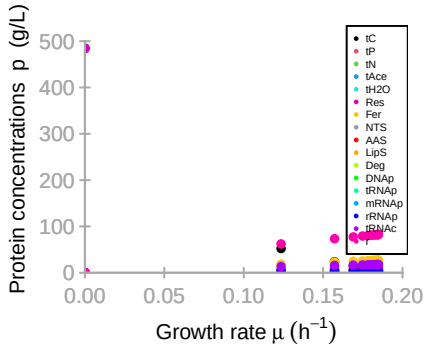

tH2O
Proteome fraction ϕ
0.008
0.006
0.004
0.002
0.000
0.00
0.05
0.10
0.15
0.20
Growth rate μ (h−1)

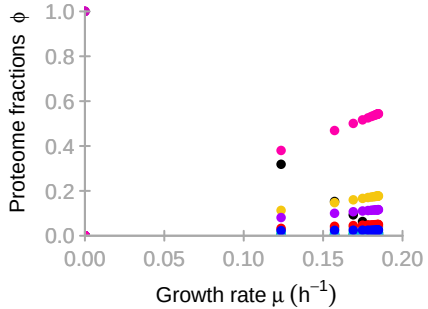

Res
Proteome fraction ϕ
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.05
0.10
0.15
0.20
Growth rate μ (h−1)

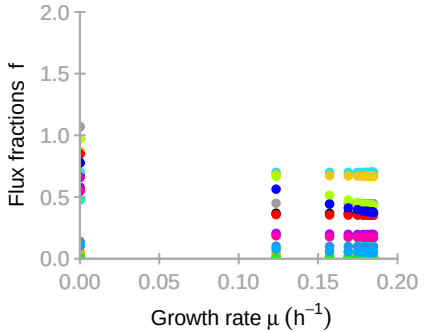

Fer
Proteome fraction ϕ
0.15
0.10
0.05
0.00
0.00
0.05
0.10
0.15
0.20
Growth rate μ (h−1)

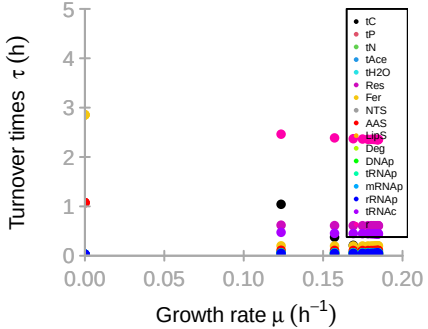

NTS
AAS
LipS
Deg
DNAp
tRNAp
mRNAp
rRNAp
tRNAc
r
Proteome fraction ϕ
Growth rate μ (h−1)

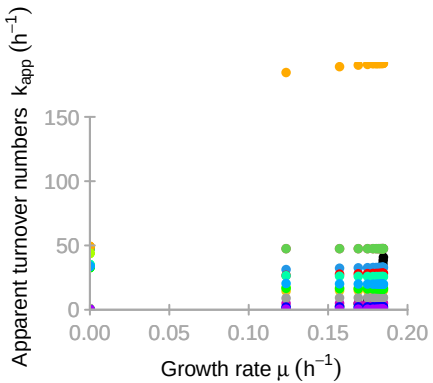

Metabolite concentrations c^m (g/L)
C
P
N
W
ADP
ATP
AA
NT
Lip
DNA
tRNA
mRNA
rRNA
TC
Growth rate μ (h^{-1})

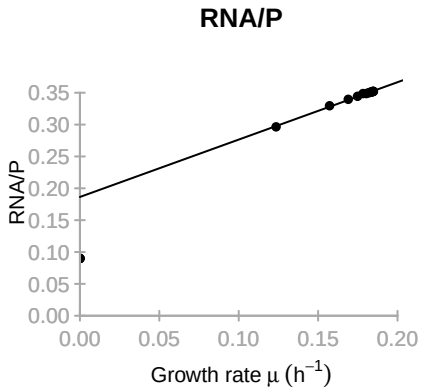

Protein concentrations p (g/L)
tC
tP
tN
tAce
tH2O
Res
Fer
NTS
AAS
LipS
Deg
DNAp
tRNAp
mRNAp
rRNAp
tRNAc
Growth rate μ (h^{-1})

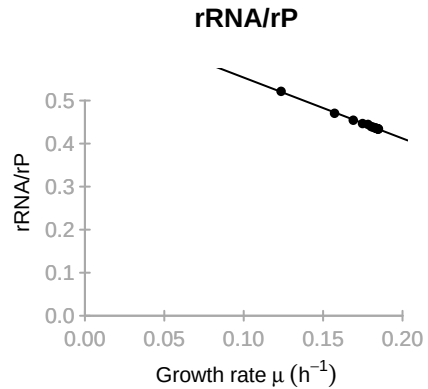

Proteome fractions ϕ
Growth rate μ (h^{-1})

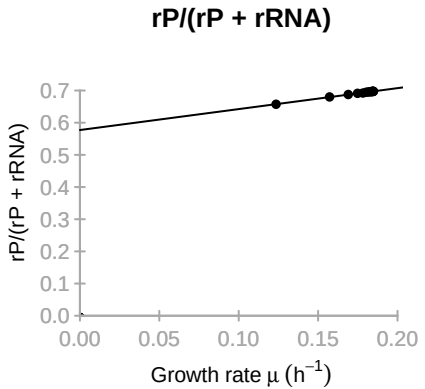

Flux fractions f
Growth rate μ (h^{-1})

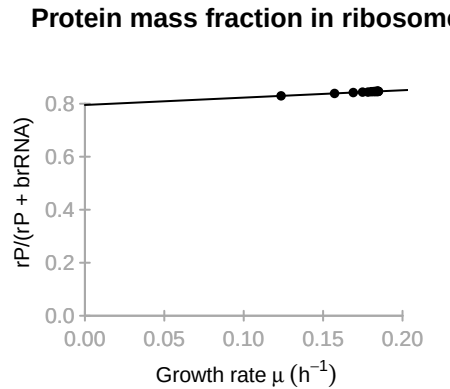

Turnover times τ (h)
tC
tP
tN
tAce
tH2O
Res
Fer
NTS
AAS
LipS
Deg
DNAp
tRNAp
mRNAp
rRNAp
tRNAc
Growth rate μ (h^{-1})

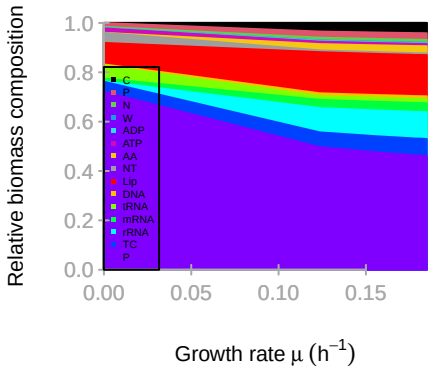

Apparent turnover numbers k_{app} (h^{-1})
Growth rate μ (h^{-1})

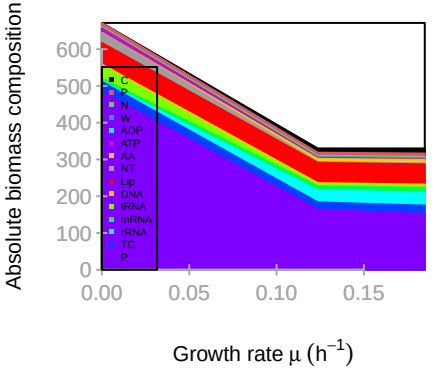

RNA/P
RNA/P
Growth rate μ (h^{-1})

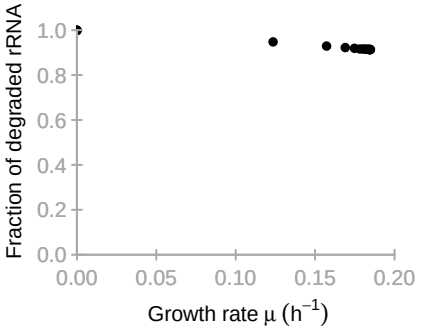

rRNA/rP
rRNA/rP
Growth rate μ (h^{-1})


rP/(rP + rRNA)
rP/(rP + rRNA)
Growth rate μ (h^{-1})


Protein mass fraction in ribosome
rP/(rP + brRNA)
Growth rate μ (h^{-1})


Relative biomass composition
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.05
0.10
0.15
C
P
N
W
ADP
ATP
AA
NT
Lip
DNA
tRNA
mRNA
rRNA
TC
P
Growth rate μ (h−1)


Absolute biomass composition
600
500
400
300
200
100
0
0.00
0.05
0.10
0.15
C
P
N
W
ADP
ATP
AA
NT
Lip
DNA
tRNA
mRNA
rRNA
TC
P
Growth rate μ (h−1)


Fraction of degraded rRNA
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.05
0.10
0.15
0.20
Growth rate μ (h−1)

M

	tC	tP	tN	tAce	tH2O	Res	Fer	NTS	AAS	LipS	Deg	DNAp	tRNAp	mRNAp	rRNAp	tRNAc	r
C	1	0	0	0	0	−0.01	−0.15	−0.26	−0.25	−1	0	0	0	0	0	0	0
P	0	1	0	0	0	−0.16	−0.13	0.1	0.1	0	0	0	0	0	0	0	0
N	0	0	1	0	0	0	0	0	−0.04	0	0	0	0	0	0	0	0
W	0	0	0	−1	0	0.01	0.15	0	0	0	0	0	0	0	0	0	0
H2O	0	0	0	0	1	0.01	0	0	0	0	0	0	0	0	0	0	0
ADP	0	0	0	0	0	−0.83	−0.71	0.51	0.6	0	0	0	0	0	0	0.1	0.1
ATP	0	0	0	0	0	0.98	0.84	−0.61	−0.71	0	0	0	0	0	0	−0.1	−0.1
AA	0	0	0	0	0	0	0	−0.13	0.3	0	0	0	0	0	0	−0.2	0
NT	0	0	0	0	0	0	0	0.39	0	0	1	−1	−1	−1	−1	0	0
Lip	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
DNA	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
tRNA	0	0	0	0	0	0	0	0	0	0	−0.1	0	1	0	0	−0.7	0.1
mRNA	0	0	0	0	0	0	0	0	0	0	−0.1	0	0	1	0	0	0
rRNA	0	0	0	0	0	0	0	0	0	0	−0.8	0	0	0	1	0	0
TC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	−0.9
P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8

K

	tC	tP	tN	tAce	tH2O	Res	Fer	NTS	AAS	LipS	Deg	DNAp	tRNAp	mRNAp	rRNAp	tRNAc	r
x_C	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_P	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_Ace	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_H2O	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	5	5	5	5	5	0	0	0	0	0	0	0
P	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
W	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
H2O	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0
ADP	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0
ATP	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	4	5
AA	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	10	0
NT	0	0	0	0	0	0	0	0	0	0	0	5	3	1	2	0	0
Lip	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DNA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
tRNA	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5	0
mRNA	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
rRNA	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
TC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

KA

	tC	tP	tN	tAce	tH2O	Res	Fer	NTS	AAS	LipS	Deg	DNAp	RNAp	mRNAp	rRNAp	tRNAc	r
x_C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_Ace	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_H2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lip	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DNA	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	0	0
tRNA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mRNA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
rRNA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
TC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

kcat

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]	[,14]	[,15]	[,16]	[,17]
kcatf	50	100	100	100	1000	20	60	30	30	40	285	200	140	140	140	20	4.55
kcatb	5	5	5	5	1	1	1	1	1	4	0	0	0	0	0	0	0

Keq

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]	[,14]	[,15]	[,16]	[,17]
[1,]	10	20	20	20	100	0.266666666666667	0.8	6	2	2	Inf	Inf	Inf	Inf	Inf	Inf	Inf

minimal phi constraint

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]	[,14]	[,15]	[,16]	[,17]
[1,]	0	0	0	0	0	0	0	0	0	0	0.003	0	0	0	0	0	0

minimal f constraint

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]	[,14]	[,15]	[,16]	[,17]
[1,]	0	0	0	0	0.7	0	0	0	0	0.05	0	0	0	0	0	0	0