ATGCCGATTCGTGTGCCGGACGAGCTACCCGCCGTCAATTTCTTGCGTGAAGAAAAC
GTCTTTGTGATGACAACTTCTTGTGCGTCTGGTCAGGAAATTCGTCCACTTAAGGTT
CTGATCCTTAACCTGATGCCGAAGAAGATTGAAACTGAAAATCAGTTTCTGCGCCTG
CTTTCAAACTCACCTTTGCAGGTCGATATTCAGCTGTTGCGCATCGATTCCCGTGAA
TCGCGCAACACGCCCGCAGAGCATCTGAACAACTTCTACTGTAACTTTGAAGATATT
CAGGATCAGAACTTTGACGGTTTGATTGTAACTGGTGCGCCGCTGGGCCTGGTGGAG
TTTAATGATGTCGCTTACTGGCCGCAGATCAAACAGGTGCTGGAGTGGTCGAAAGAT
CACGTCACCTCGACGCTGTTTGTCTGCTGGGCGGTACAGGCCGCGCTCAATATCCTC
TACGGCATTCCTAAGCAAACTCGCACCGAAAAACTCTCTGGCGTTTACGAGCATCAT
ATTCTCCATCCTCATGCGCTTCTGACGCGTGGCTTTGATGATTCATTCCTGGCACCG
CATTCGCGCTATGCTGACTTTCCGGCAGCGTTGATTCGTGATTACACCGATCTGGAA
ATTCTGGCAGAGACGGAAGAAGGGGATGCATATCTGTTTGCCAGTAAAGATAAGCGC
ATTGCCTTTGTGACGGGCCATCCCGAATATGATGCGCAAACGCTGGCGCAGGAATTT
TTCCGCGATGTGGAAGCCGGACTAGACCCGGATGTACCGTATAACTATTTCCCGCAC
AATGATCCGCAAAATACACCGCGAGCGAGCTGGCGTAGTCACGGTAATTTACTGTTT
ACCAACTGGCTCAACTATTACGTCTACCAGATCACGCCATACGATCTACGGCACATG
AATCCAACGCTGGATTAA

FIG. 1

ATGCCGATTCGTGTGCCGGACGAGCTACCCGCCGTCAATTTCTTGCGTGAAGAAAAC
GTCTTTGTGATGACAACTTCTCGTGCGTCTGGTCAGGAAATTCGTCCACTTAAGGTT
CTGATCCTTAACCTGATGCCGAAGAAGATTGAAACTGAAAATCAGTTTCTGCGCCTG
CTTTCAAACTCACCTTTGCAGGTCGATATTCAGCTGTTGCGCATCGATTCCCGTGAA
TCGCGCAACACGCCCGCAGAGCATCTGAACAACTTCTACTGTAACTTTGAAGATATT
CAGGATCAGAACTTTGACGGTTTGATTGTAACTGGTGCGCCGCTGGGCCTGGTGGAG
TTTAATGATGTCGCTTACTGGCCGCAGATCAAACAGGTGCTGGAGTGGTCGAAAGAT
CACGTCACCTCGACGCTGTTTGTCTGCTGGGCGGTACAGGCCGCGCTCAATATCCTC
TACGGCATTCCTAAGCAAACTCGCACCGAAAAACTCTCTGGCGTTTACGAGCATCAT
ATTCTCCATCCTCATGCGCTTCTGACGCGTGGCTTTGATGATTCATTCCTGGCACCG
CATTCGCGCTATGCTGACTTTCCGGCAGCGTTGATTCGTGATTACACCGATCTGGAA
ATTCTGGCAGAGACGGAAGAAGGGGATGCATATCTGTTTGCCAGTAAAGATAAGCGC
ATTGCCTTTGTGACGGGCCATCCCGAATATGATGCGCAAACGCTGGCGCAGGAATTT
TTCCGCGATGTGGAAGCCGGACTAGACCCGGATGTACCGTATAACTATTTCCCGCAC
AATGATCCGCAAAATACACCGCGAGCGAGCTGGCGTAGTCACGGTAATTTACTGTTT
ACCAACTGGCTCAACTATTACGTCTGCCAGATCACGCCATACGATCTACGGCACATG
AATCCAACGCTGGATTAA

FIG. 2

ATGCCGATTCGTGTGCCGGACGAGCTACCCGCCGTCAATTTCTTGCGTGAAGAAAAC
GTCTTTGTGATGACAACTTCTCGTGCGTCTGGTCAGGAAATTCGTCCACTTAAGGTT
CTGATCCTTAACCTGATGCCGAAGAAGATTGAAACTGAAAATCAGTTTCTGCGCCTG
CTTTCAAACTCACCTTTGCAGGTCGATATTCAGCTGTTGCGCATCGATTCCCGTGAA
TCGCGCAACACGCCCGCAGAGCATCTGAACAACTTCTACTGTAACTTTGAAGATATT
CAGGATCAGAACTTTGACGGTTTGATTGTAACTGGTGCGCCGCTGGGCCTGGTGGAG
TTTAATGATGTCGCTTACTGGCCGCAGATCAAACAGGTGCTGGAGTGGTCGAAAGAT
CACGTCACCTCGACGCTGTTTGTCTGCTGGGCGGTACAGGCCGCGCTCAATATCCTC
TACGGCATTCCTAAGCAAACTCGCACCGAAAAACTCTCTGGCGTTTACGAGCATCAT
ATTCTCCATCCTCATGCGCTTCTGACGCGTGGCTTTGATGATTCATTCCTGGCACCG
CATTCGCGCTATGCTGACTTTCCGGCAGCGTTGATTCGTGATTACACCGATCTGGAA
ATTCTGGCAGAGACGGAAGAAGGGGATGCATATCTGTTTGCCAGTAAAGATAAGCGC
ATTGCCTTTGTGACGGGCCATCCCGAATATGATGCGCAAACGCTGGCGCAGGAATTT
TTCCGCGATGTGGAAGCCGGACTAGACCCGGATGTACCGTATAACTATTTCCCGCAC
AATGATCCGCAAAATACACCGCGAGCGAGCTGGCGTAGTCACGGTAATTTACTGTTT
ACCAACTGGCTCAACTATTACGTCTACCAGAGCACGCTATACGATCTACGGCACATG
AATCCAACGCTGGATTAA

FIG. 3

ATGCCGATTCGTGTGCCGGACGAGCTACCCGCCGTCAATTTCTTGCGTGAAGAAAAC
GTCTTTGTGATGACAACTTCTCGTGCGTCTGGTCAGGAAATTCGTCCACTTAAGGTT
CTGATCCTTAACCTGATGCCGAAGAAGATTGAAACTGAAAATCAGTTTCTGCGCCTG
CTTTCAAACTCACCTTTGGAGGTCGATATTCAGCTGTTGCGCATCGATTCCCGTGAA
TCGCGCAACACGCCCGCAGAGCATCTGAACAACTTCTACTGTAACTTTGAAGATATT
CAGGATCAGAACTTTGACGGTTTGATTGTAACTGGTGCGCCGCTGGGCCTGGTGGAG
TTTAATGATGTCGCTTACTGGCCGCAGATCAAACAGGTGCTGGAGTGGTCGAAAGAT
CACGTCACCTCGACGCTGTTTGTCTGCTGGGCGGTACAGGCCGCGCTCAATATCCTC
TACGGCATTCCTAAGCAAACTCGCACCGAAAAACTCTCTGGCGTTTACGAGCATCAT
ATTCTCCATCCTCATGCGCTTCTGACGCGTGGCTTTGATGATTCATTCCTGGCACCG
CATTCGCGCTATGCTGACTTTCCGGCAGCGTTGATTCGTGATTACACCGATCTGGAA
ATTCTGGCAGAGACGGAAGAAGGGGATGCATATCTGTTTGCCAGTAAAGATAAGCGC
ATTGCCTTTGTGACGGGCCATCCCGAATATGATGCGCAAACGCTGGCGCAGGAATTT
TTCCGCGATGTGGAAGCCGGACTAGACCCGGATGTACCGTATAACTATTTCCCGCAC
AATGATCCGCAAAATACACCGCGAGCGAGCTGGCGTAGTCACGGTAATTTACTGTTT
ACCAACTGGCTCAACTATTACGTCTACCAGATCACGCCATACGATCTACGGCACATG
AATCCAACGCTGGATTAA

FIG. 4

ATGGCAAAACACCTTTTTACGTCCGAGTCCGTCTCTGAAGGGCATCCTGACAAAATT
GCTGACCAAATTTCTGATGCCGTTTTAGACGCGATCCTCGAACAGGATCCGAAAGCA
CGCGTTGCTTGCGAAACCTACGTAAAAACCGGCATGGTTTTAGTTGGCGGCGAAATC
ACCACCAGCGCCTGGGTAGACATCGAAGAGATCACCCGTAACACCGTTCGCGAAATT
GGCTATGTGCATTCCGACATGGGCTTTGACGCTAACTCCTGTGCGGTTCTGAGCGCT
ATCGGCAAACAGTCTCCTGACATCAACCAGGGCGTTGACCGTGCCGATCCGCTGGAA
CAGGGCGCGGGTGACCAGGGTCTGATGTTTGGCTACGCAACTAATGAAACCGACGTG
CTGATGCCAGCACCTATCACCTATGCACACCGTCTGGTACAGCGTCAGGCTGAAGTG
CGTAAAAACGGCACTCTGCCGTGGCTGCGCCCGGACGCGAAAAGCCAGGTGACTTTT
CAGTATGACGACGGCAAAATCGTTGGTATCGATGCTGTCGAGCTTTCCACTCAGCAC
TCTGAAGAGATCGACCAGAAATCGCTGCAAGAAGCGGTAATGGAAGAGATCATCAAG
CCAATTCTGCCCGCTGAATGGCTGACTTCTGCCACCAAATTCTTCATCAACCCGACC
GGTCGTTTCGTTATCGGTGGCCCAATGGGTGACTGCGGTCTGACTGGTCGTAAAATT
ATCGTTGATACCTACGGCGGCATGGCGCGTCACGGTGGCGGTGCATTCTCTGGTAAA
GATCCATCAAAAGTGGACCGTTCCGCAGCCTACGCAGCACGTTATGTCGCGAAAAAC
ATCGTTGCTGCTGGCCTGGCCGATCGTTGTGAAATTCAGGTTTCCTACGCAATCGGC
GTGGCTGAACCGACCTCCATCATGGTAGAAACTTTCGGTACTGAGAAAGTGCCTTCT
GAACAACTGACCCTGCTGGTACGTGAGTTCTTCGACCTGCGCCCATACGGTCTGATT
CAGATGCTGGATCTGCTGCACCCGATCTACAAAGAAACCGCAGCATACGGTCACTTT
GGTCGTGAACATTTCCCGTGGGAAAAAACCGACAAAGCGCAGCTGCTGCGCGATGCT
GCCGGTCTGAAGTAA

FIG. 5

ATGGCAAAACACCTTTTTACGTCCGAGTCCGTCTCTGAAGGGCATCCTGACAAAATT
GCTGACCAAATTTCTGATGCCGTTTTAGACGCGATCCTCGAACAGGATCCGAAAGCA
CGCGTTGCTTGCGAAACCTACGTAAAAACCGGCATGGTTTTAGTTGGCGGCGAAATC
ACCACCAGCGCCTGGGTAGACATCGAAGAGATCACCCGTAACACCGTTCGCGAAATT
GGCTATGTGCATTCCGACATGGGCTTTGACGCTAACTCCTGTGCGGTTCTGAGCGCT
ATCGGCAAACAGTCTCCTGACATCAACCAGGGCGTTGACCGTGCCGATCCGCTGGAA
CAGGGCGCGGGTGACCAGGGTCTGATGTTTGGCTACGCAACTAATGAAACCGACGTG
CTGATGCCAGCACCTATCACCTATGCACACCGTCTGGTACAGCGTCAGGCTGAAGTG
CGTAAAAACGGCACTCTGCCGTGGCTGCGCCCGGACGCGAAAAGCCAGGTGACTTTT
CAGTATGACGACGGCAAAATCGTTGGTATCGATGCTGTCGTGCTTTCCACTCAGCAC
TCTGAAGAGATCGACCAGAAATCGCTGCAAGAAGCGGTAATGGAAGAGATCATCAAG
CCAATTCTGCCCGCTGAATGGCTGACTTCTGCCACCAAATTCTTCATCAACCCGACC
GGTCGTTTCGTTATCGGTGGCCCAATGGGTGACTGCGGTCTGACTGGTCGTAAAATT
ATCGTTGATACCTACGGCGGCATGGCGCGTCACGGTGGCGGTGCATTCTCTGGTAAA
GATCCATCAAAAGTGGACCGTTCCGCAGCCTACGCAGCACGTTATGTCGCGAAAAAC
ATCGTTGCTGCTGGCCTGGCCGATCGTTGTGAAATTCAGGTTTCCTACGCAATCGGC
GTGGCTGAACCGACCTCCATCATGGTAGAAACTTTCGGTACTGAGAAAGTGCCTTCT
GAACAACTGACCCTGCTGGTACGTGAGTTCTTCGACCTGCGCCCATACGGTCTGATT
CAGATGCTGGATCTGCTGCACCCGATCTACAAAGAAACCGCAGCATACGGTCACTTT
GGTCGTGAACATTTCCCGTGGGAAAAAACCGACAAAGCGCAGCTGCTGGCGATGCTG
CCGGTCTGAAGTAA

FIG. 6

MPIRVPDELPAVNFLREENVFVMTTSRASGQEIRPLKVLILNLMPKKIETENQFLRL
LSNSPLQVDIQLLRIDSRESRNTPAEHLNNFYCNFEDIQDQNFDGLIVTGAPLGLVE
FNDVAYWPQIKQVLEWSKDHVTSTLFVCWAVQAALNILYGIPKQTRTEKLSGVYEHH
ILHPHALLTRGFDDSFLAHSRYADFPAALIRDYTDLEILAETEEGDAYLFASKDKRI
AFVTGHPEYDAQTLAQEFFRDVEAGLDPDVPYNYFPHNDPQNTPRASWRSHGNLLFT
NWLNYYVYQITPYDLRHMNPTLD

FIG. 7A

ATGCCGATTCGTGTGCCGGACGAGCTACCCGCCGTCAATTTCTTGCGTGAAGAAAAC
GTCTTTGTGATGACAACTTCTTGTGCGTCTGGTCAGGAAATTCGTCCACTTAAGGTT
CTGATCCTTAACCTGATGCCGAAGAAGATTGAAACTGAAAATCAGTTTCTGCGCCTG
CTTTCAAACTCACCTTTGCAGGTCGATATTCAGCTGTTGCGCATCGATTCCCGTGAA
TCGCGCAACACGCCCGCAGAGCATCTGAACAACTTCTACTGTAACTTTGAAGATATT
CAGGATCAGAACTTTGACGGTTTGATTGTAACTGGTGCGCCGCTGGGCCTGGTGGAG
TTTAATGATGTCGCTTACTGGCCGCAGATCAAACAGGTGCTGGAGTGGTCGAAAGAT
CACGTCACCTCGACGCTGTTTGTCTGCTGGGCGGTACAGGCCGCGCTCAATATCCTC
TACGGCATTCCTAAGCAAACTCGCACCGAAAAACTCTCTGGCGTTTACGAGCATCAT
ATTCTCCATCCTCATGCGCTTCTGACGCGTGGCTTTGATGATTCATTCCTGGCACCG
CATTCGCGCTATGCTGACTTTCCGGCAGCGTTGATTCGTGATTACACCGATCTGGAA
ATTCTGGCAGAGACGGAAGAAGGGGATGCATATCTGTTTGCCAGTAAAGATAAGCGC
ATTGCCTTTGTGACGGGCCATCCCGAATATGATGCGCAAACGCTGGCGCAGGAATTT
TTCCGCGATGTGGAAGCCGGACTAGACCCGGATGTACCGTATAACTATTTCCCGCAC
AATGATCCGCAAAATACACCGCGAGCGAGCTGGCGTAGTCACGGTAATTTACTGTTT
ACCAACTGGCTCAACTATTACGTCTACCAGATCACGCCATACGATCTACGGCACATG
AATCCAACGCTGGATTAA

FIG. 7B

MAKHLFTSESVSEGHPDKIADQISDAVLDAILEQDPKARVACETYVKTGMVLVGGEI
TTSAWVDIEEITRNTVREIGYVHSDMGFDANSCAVLSAIGKQSPDINQGVDRADPLE
QGAGDQGLMFGYATNETDVLMPAPITYAHRLVQRQAEVRKNGTLPWLRPDAKSQVTF
QYDDGKIVGIDAVVLSTQHSEEIDQKSLQEAVMEEIIKPILPAEWLTSATKFFINPT
GRFVIGGPMGDCGLTGRKIIVDTYGGMARHGGGAFSGKDPSKVDRSAAYAARYVAKN
IVAAGLADRCEIQVSYAIGVAEPTSIMVETFGTEKVPSEQLTLLVREFFDLRPYGLI
QMLDLLHPIYKETAAYGHFGREHFPWEKTDKAQLLRDAAGLK

FIG. 8A

ATGGCAAAACACCTTTTTACGTCCGAGTCCGTCTCTGAAGGGCATCCTGACAAAATT
GCTGACCAAATTTCTGATGCCGTTTTAGACGCGATCCTCGAACAGGATCCGAAAGCA
CGCGTTGCTTGCGAAACCTACGTAAAAACCGGCATGGTTTTAGTTGGCGGCGAAATC
ACCACCAGCGCCTGGGTAGACATCGAAGAGATCACCCGTAACACCGTTCGCGAAATT
GGCTATGTGCATTCCGACATGGGCTTTGACGCTAACTCCTGTGCGGTTCTGAGCGCT
ATCGGCAAACAGTCTCCTGACATCAACCAGGGCGTTGACCGTGCCGATCCGCTGGAA
CAGGGCGCGGGTGACCAGGGTCTGATGTTTGGCTACGCAACTAATGAAACCGACGTG
CTGATGCCAGCACCTATCACCTATGCACACCGTCTGGTACAGCGTCAGGCTGAAGTG
CGTAAAAACGGCACTCTGCCGTGGCTGCGCCCGGACGCGAAAAGCCAGGTGACTTTT
CAGTATGACGACGGCAAAATCGTTGGTATCGATGCTGTCGTGCTTTCCACTCAGCAC
TCTGAAGAGATCGACCAGAAATCGCTGCAAGAAGCGGTAATGGAAGAGATCATCAAG
CCAATTCTGCCCGCTGAATGGCTGACTTCTGCCACCAAATTCTTCATCAACCCGACC
GGTCGTTTCGTTATCGGTGGCCCAATGGGTGACTGCGGTCTGACTGGTCGTAAAATT
ATCGTTGATACCTACGGCGGCATGGCGCGTCACGGTGGCGGTGCATTCTCTGGTAAA
GATCCATCAAAAGTGGACCGTTCCGCAGCCTACGCAGCACGTTATGTCGCGAAAAAC
ATCGTTGCTGCTGGCCTGGCCGATCGTTGTGAAATTCAGGTTTCCTACGCAATCGGC
GTGGCTGAACCGACCTCCATCATGGTAGAAACTTTCGGTACTGAGAAAGTGCCTTCT
GAACAACTGACCCTGCTGGTACGTGAGTTCTTCGACCTGCGCCCATACGGTCTGATT
CAGATGCTGGATCTGCTGCACCCGATCTACAAAGAAACCGCAGCATACGGTCACTTT
GGTCGTGAACATTTCCCGTGGGAAAAAACCGACAAAGCGCAGCTGCTGCGCGATGCT
GCCGGTCTGAAGTAA

FIG. 8B

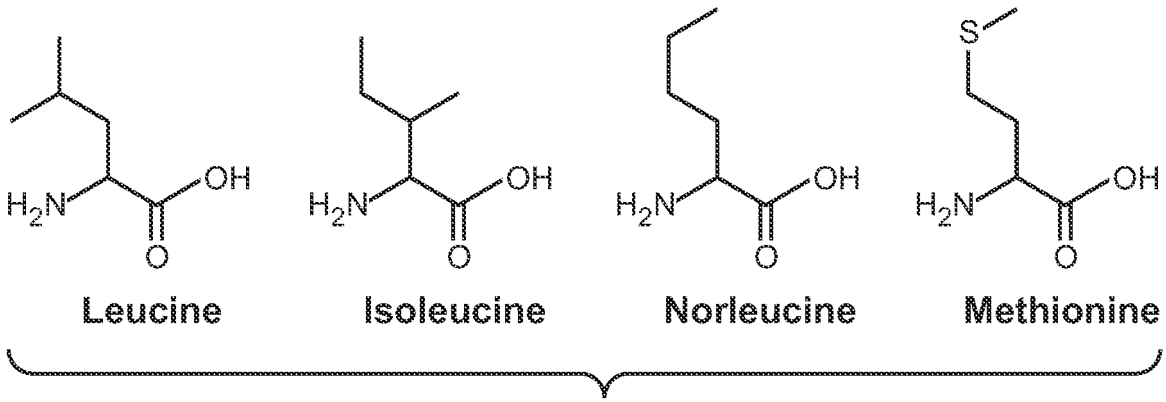

Leucine
Isoleucine
Norleucine
Methionine

FIG. 9

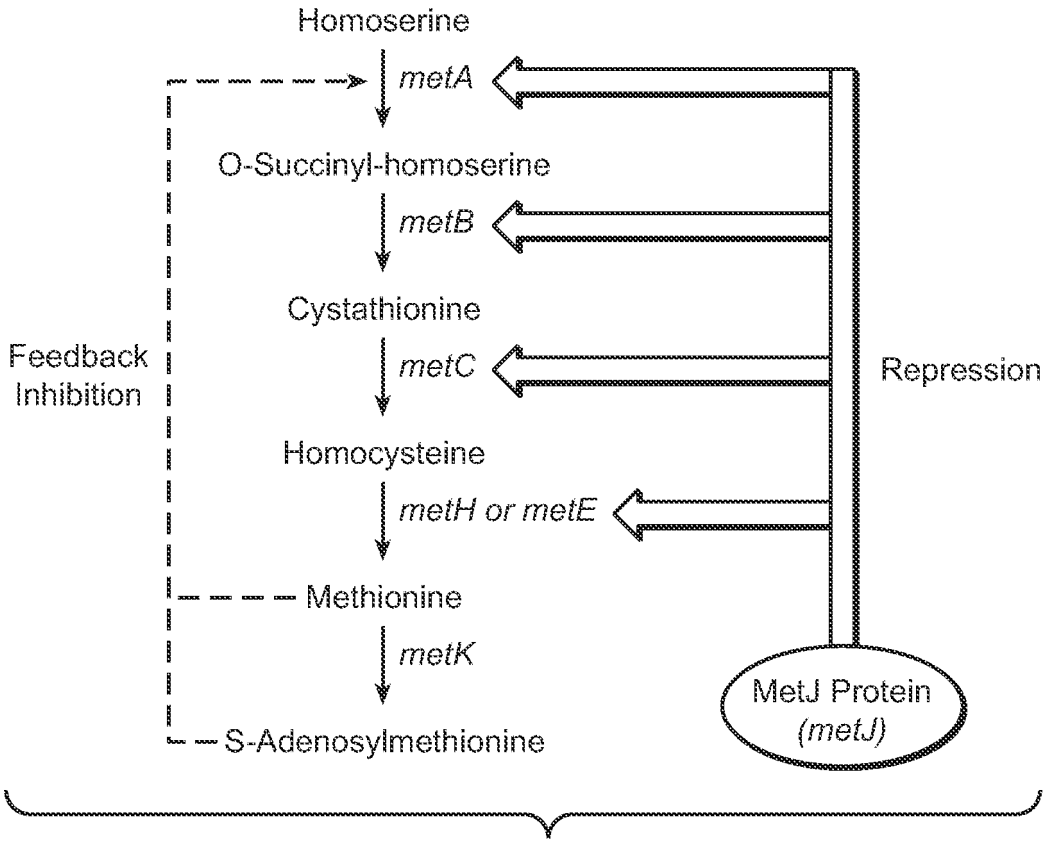

Homoserine
metA
O-Succinyl-homoserine
metB
Cystathionine
metC
Homocysteine
metH or metE
Methionine
metK
S-Adenosylmethionine
Feedback Inhibition
Repression
MetJ Protein (metJ)

FIG. 11

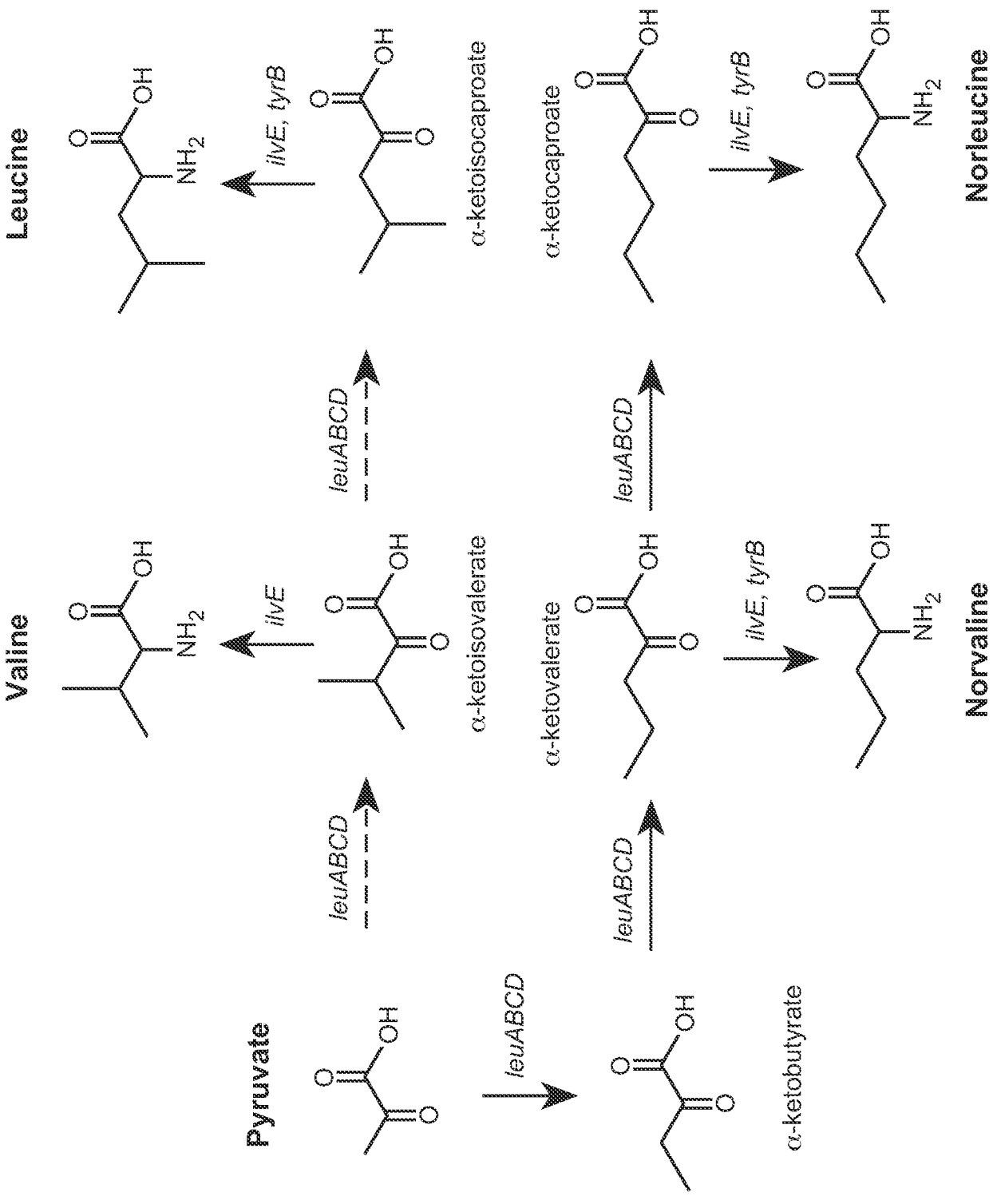

Pyruvate
leuABCD
α-ketobutyrate
ilvE, tyrB
Norvaline
leuABCD
α-ketovalerate
ilvE
Valine
leuABCD
α-ketoisovalerate
ilvE, tyrB
Norleucine
leuABCD
α-ketocaproate
ilvE, tyrB
Leucine
leuABCD
α-ketoisocaproate

FIG. 10

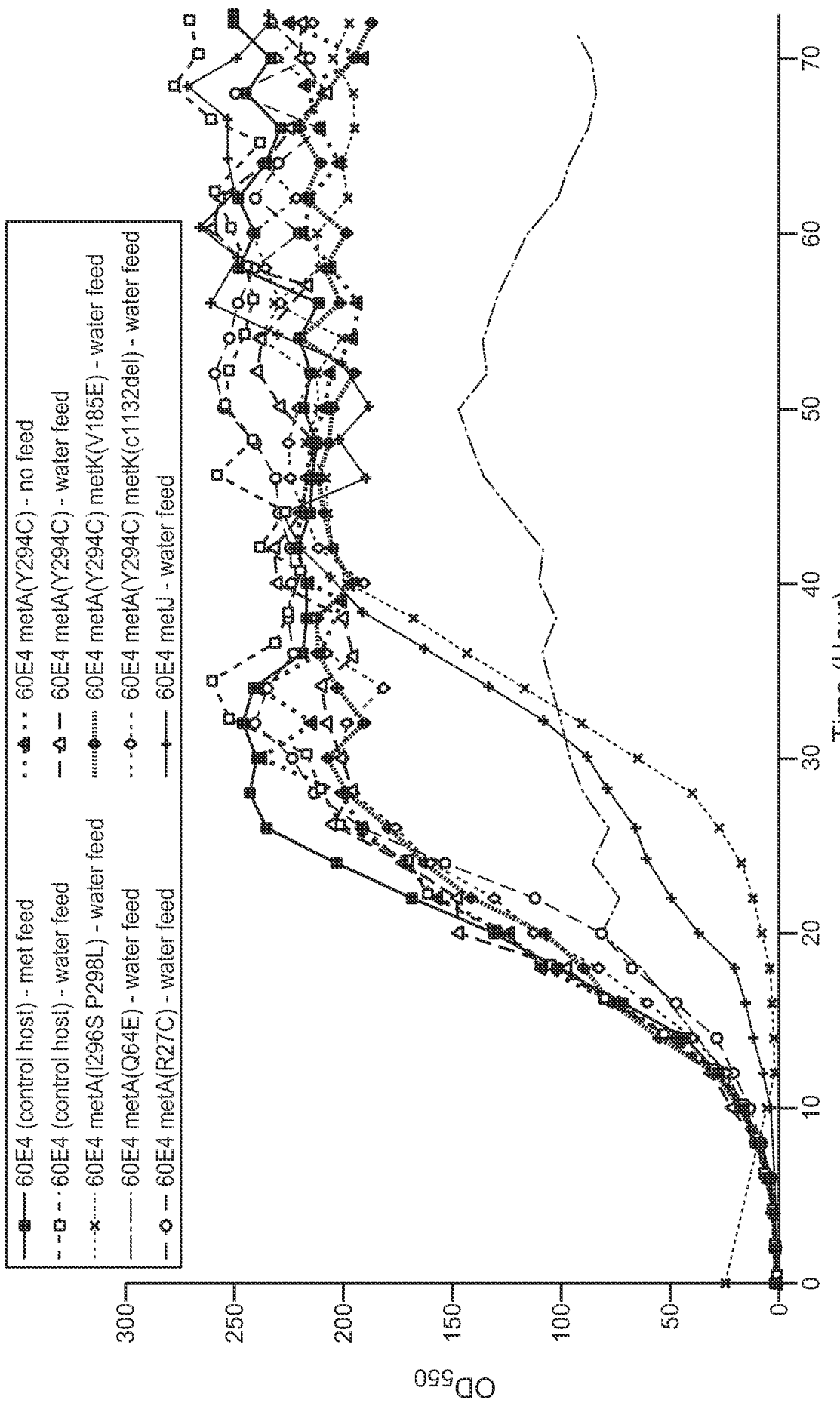

60E4 (control host) - met feed
60E4 (control host) - water feed
60E4 metA(I296S P298L) - water feed
60E4 metA(Q64E) - water feed
60E4 metA(R27C) - water feed
60E4 metA(Y294C) - no feed
60E4 metA(Y294C) - water feed
60E4 metA(Y294C) metK(V185E) - water feed
60E4 metA(Y294C) metK(c1132del) - water feed
60E4 metJ - water feed
OD550
Time (Hour)
0
50
100
150
200
250
300
0
10
20
30
40
50
60
70

FIG. 12A

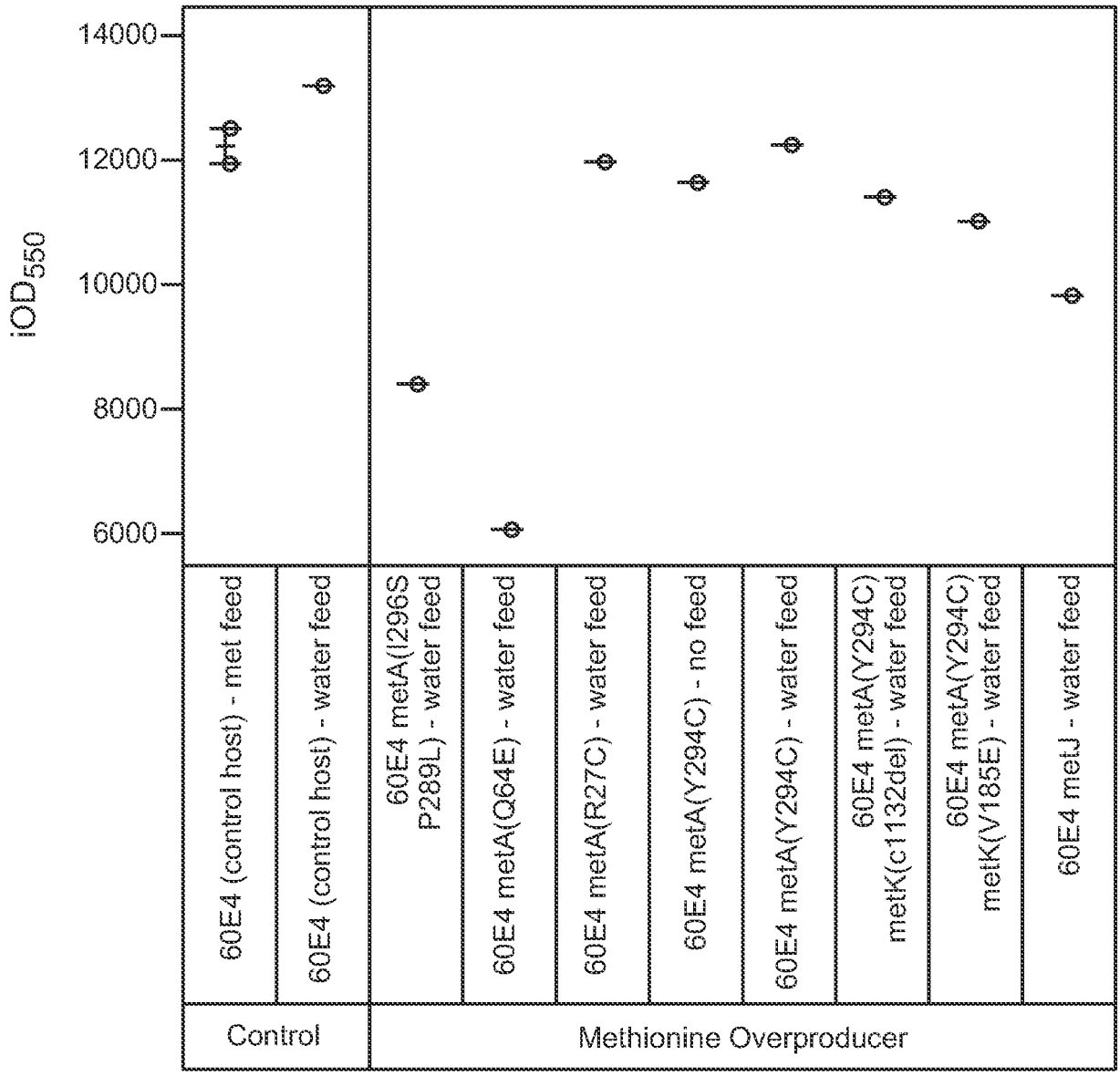

iOD550
14000
12000
10000
8000
6000
60E4 (control host) - met feed
60E4 (control host) - water feed
60E4 metA(I296S P289L) - water feed
60E4 metA(Q64E) - water feed
60E4 metA(R27C) - water feed
60E4 metA(Y294C) - no feed
60E4 metA(Y294C) - water feed
60E4 metA(Y294C) metK(c1132del) - water feed
60E4 metA(Y294C) metK(V185E) - water feed
60E4 metJ - water feed
Control
Methionine Overproducer

FIG. 12B

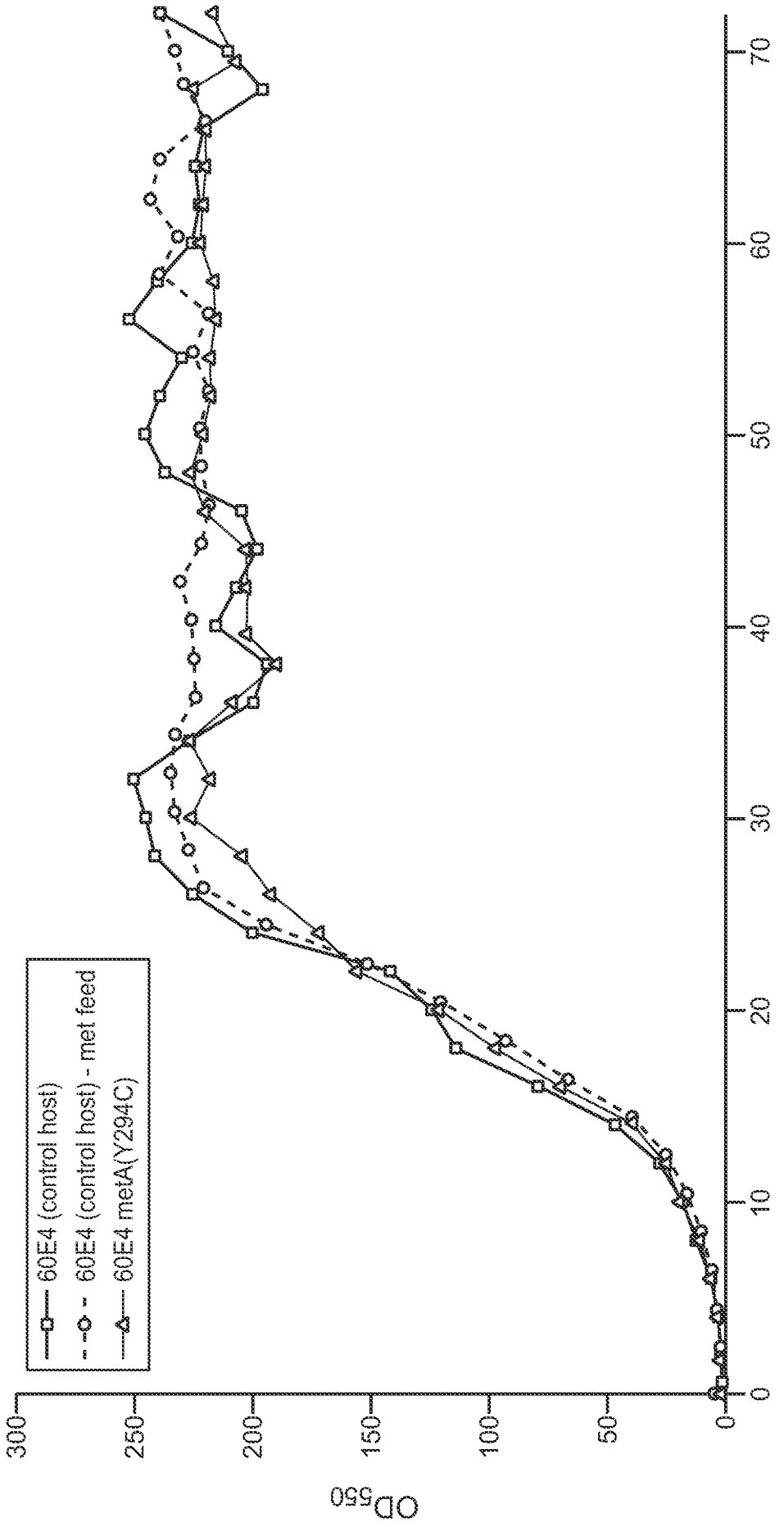

60E4 (control host)
60E4 (control host) - met feed
60E4 metA(Y294C)
OD550
Time (Hour)
0
50
100
150
200
250
300
0
10
20
30
40
50
60
70

FIG. 12C

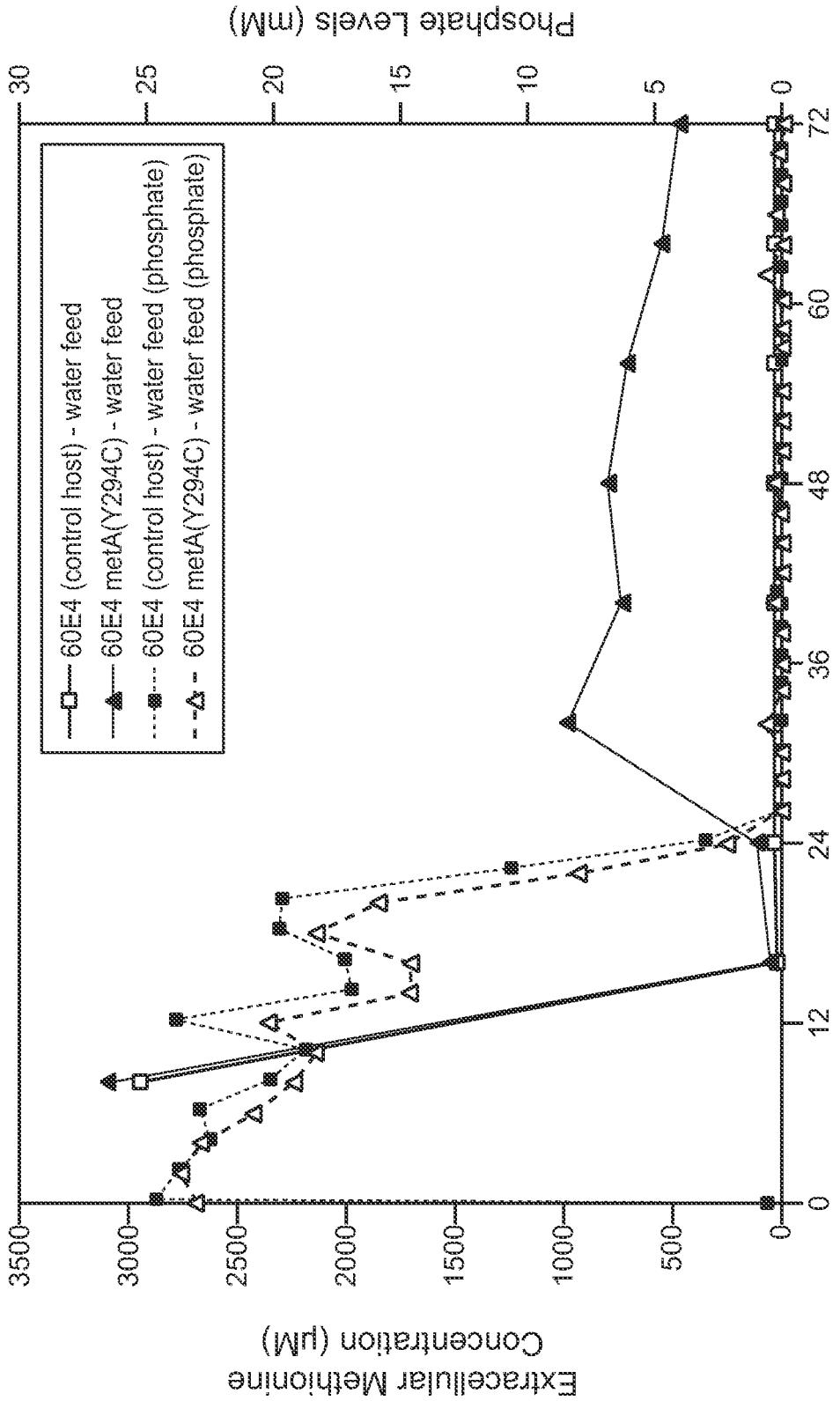

Extracellular Methionine Concentration (μM)
Phosphate Levels (mM)
Time (Hour)
60E4 (control host) - water feed
60E4 metA(Y294C) - water feed
60E4 (control host) - water feed (phosphate)
60E4 metA(Y294C) - water feed (phosphate)
0
500
1000
1500
2000
2500
3000
3500
0
5
10
15
20
25
30
0
12
24
36
48
60
72

FIG. 13A

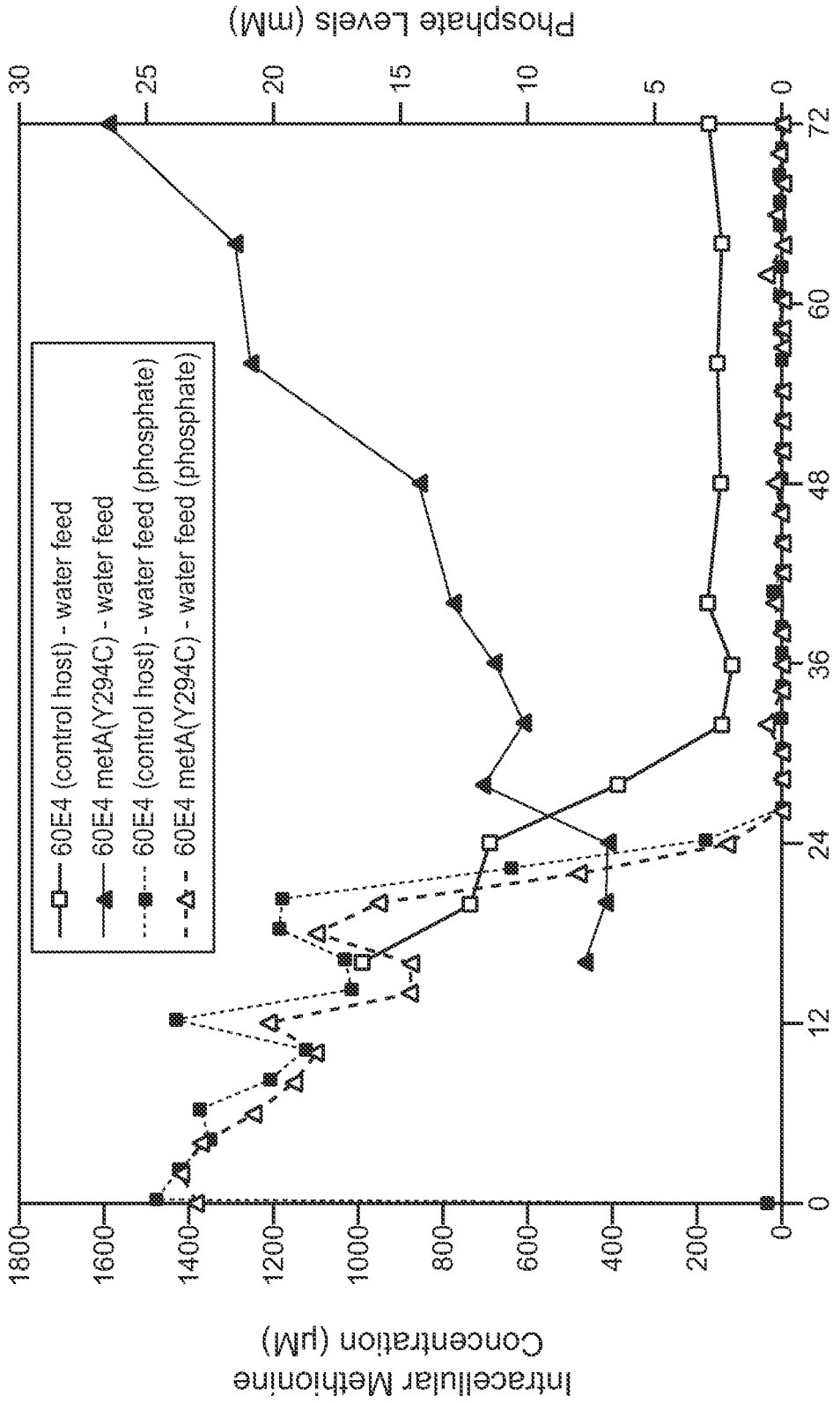

Intracellular Methionine Concentration (μM)
Phosphate Levels (mM)
Time (Hour)
60E4 (control host) - water feed
60E4 metA(Y294C) - water feed
60E4 (control host) - water feed (phosphate)
60E4 metA(Y294C) - water feed (phosphate)
0
200
400
600
800
1000
1200
1400
1600
1800
0
5
10
15
20
25
30
0
12
24
36
48
60
72

FIG. 13B

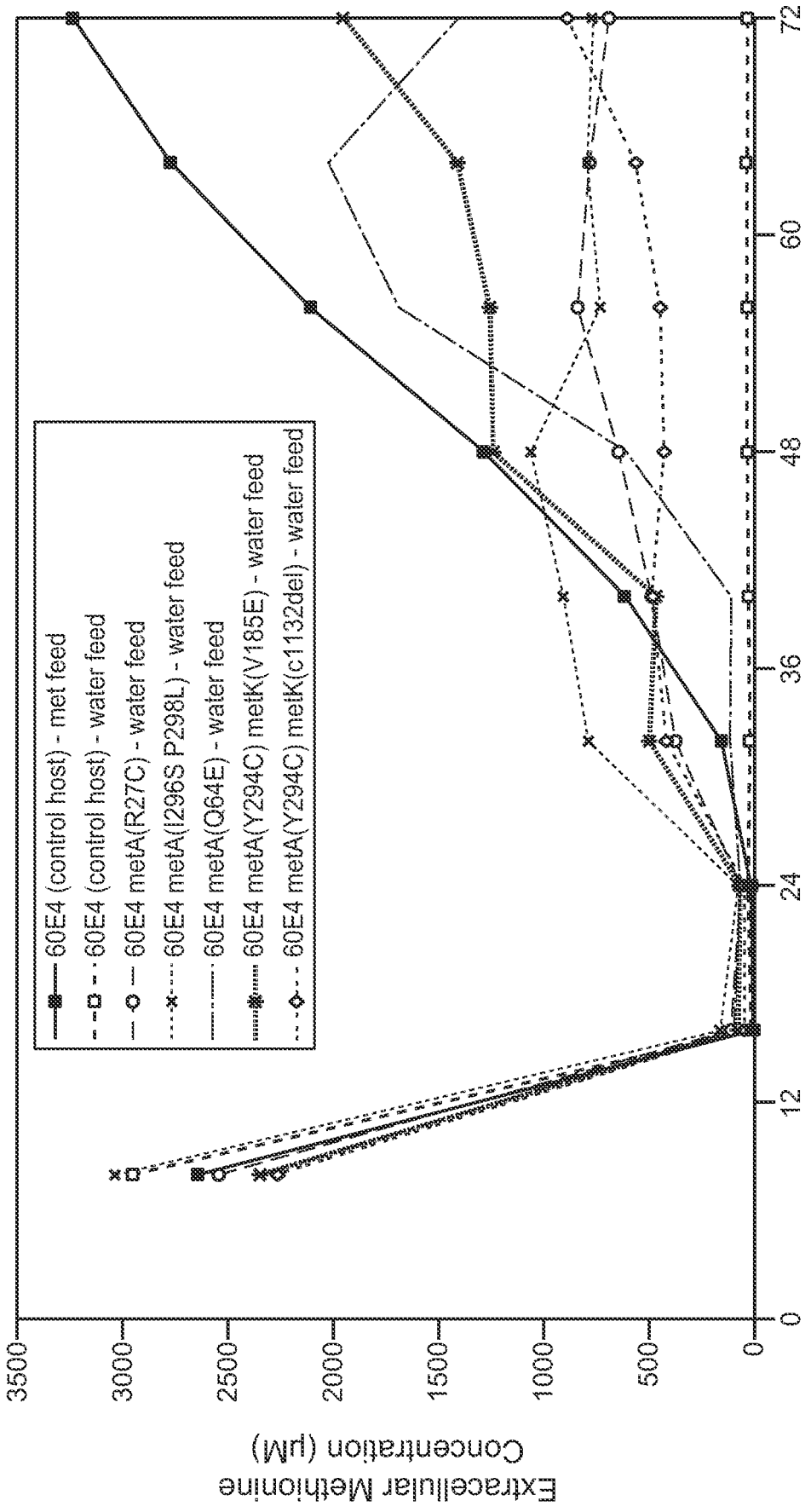

Extracellular Methionine Concentration (μM)
3500
3000
2500
2000
1500
1000
500
0
0
12
24
36
48
60
72
Time (Hour)
60E4 (control host) - met feed
60E4 (control host) - water feed
60E4 metA(R27C) - water feed
60E4 metA(I296S P298L) - water feed
60E4 metA(Q64E) - water feed
60E4 metA(Y294C) metK(V185E) - water feed
60E4 metA(Y294C) metK(c1132del) - water feed

FIG. 14A

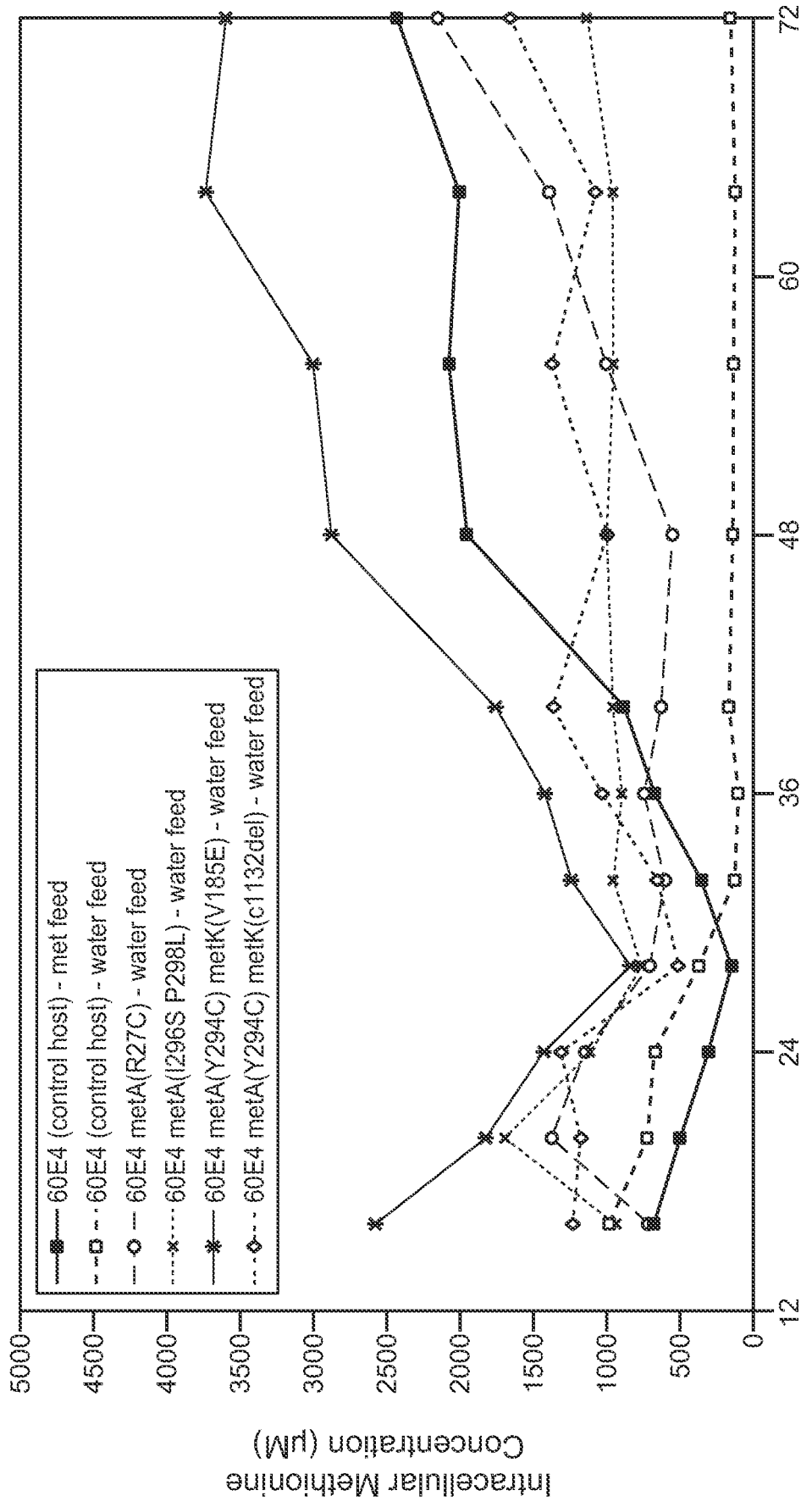

Intracellular Methionine Concentration (μM)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
12
24
36
48
60
72
Time (Hour)
60E4 (control host) - met feed
60E4 (control host) - water feed
60E4 metA(R27C) - water feed
60E4 metA(I296S P298L) - water feed
60E4 metA(Y294C) metK(V185E) - water feed
60E4 metA(Y294C) metK(c1132del) - water feed

FIG. 14B

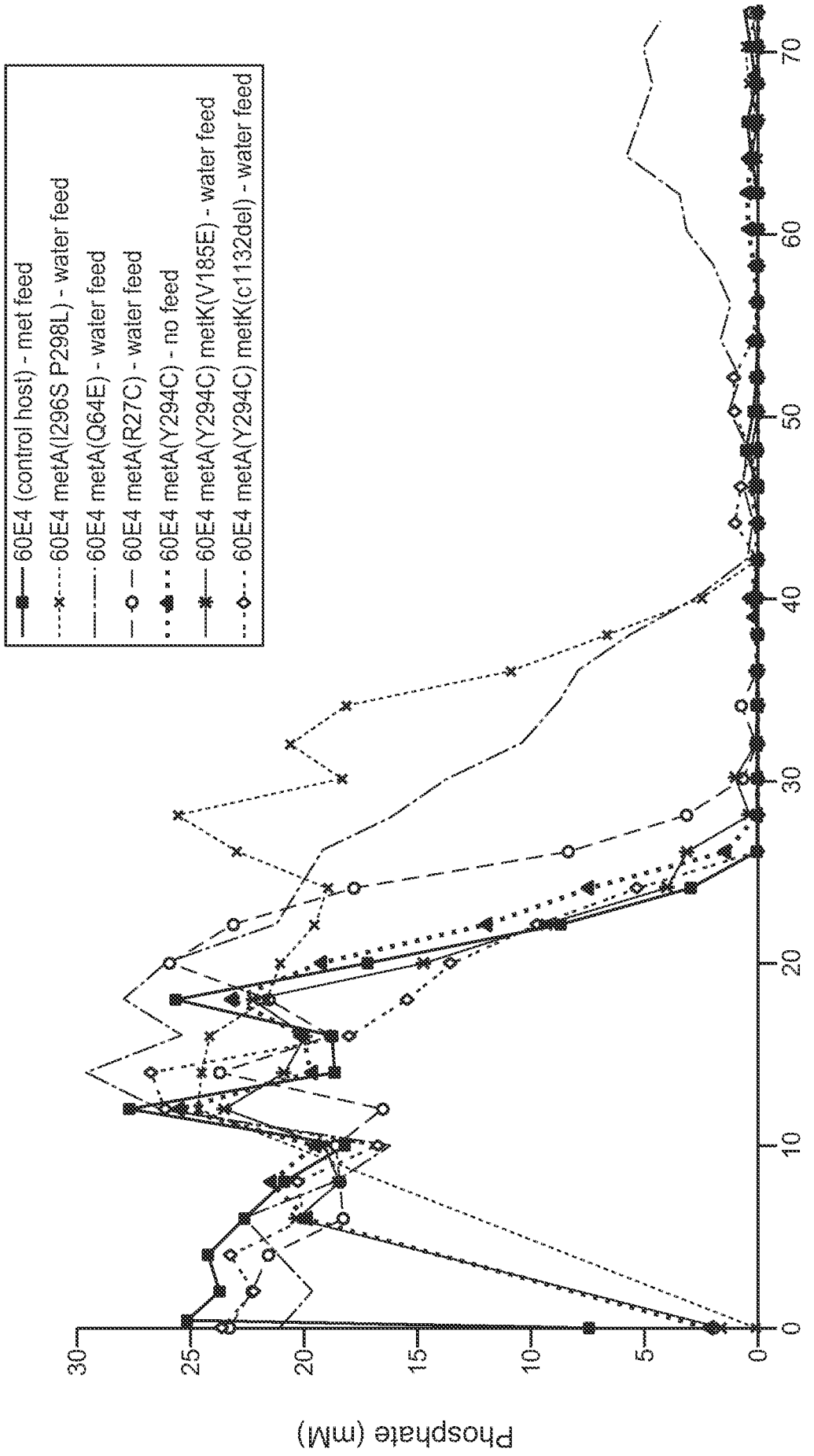

60E4 (control host) - met feed
60E4 metA(I296S P298L) - water feed
60E4 metA(Q64E) - water feed
60E4 metA(R27C) - water feed
60E4 metA(Y294C) - no feed
60E4 metA(Y294C) metK(V185E) - water feed
60E4 metA(Y294C) metK(c1132del) - water feed
Phosphate (mM)
Time (Hour)
0
5
10
15
20
25
30
0
10
20
30
40
50
60
70

FIG. 15

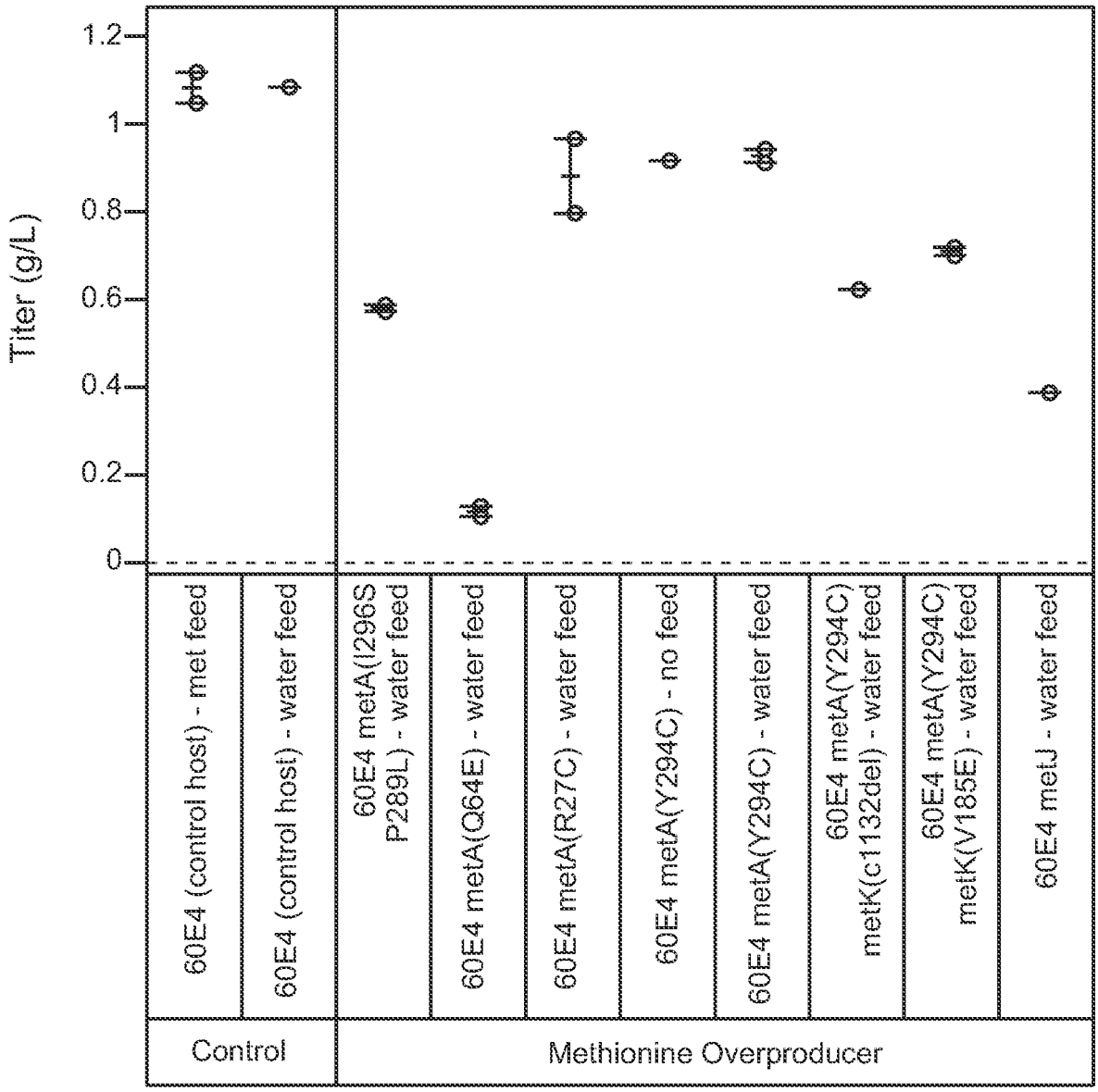

Titer (g/L)
1.2
1
0.8
0.6
0.4
0.2
0
60E4 (control host) - met feed
60E4 (control host) - water feed
60E4 metA(I296S P289L) - water feed
60E4 metA(Q64E) - water feed
60E4 metA(R27C) - water feed
60E4 metA(Y294C) - no feed
60E4 metA(Y294C) - water feed
60E4 metA(Y294C) metK(c1132del) - water feed
60E4 metA(Y294C) metK(V185E) - water feed
60E4 metJ - water feed
Control
Methionine Overproducer

FIG. 16A

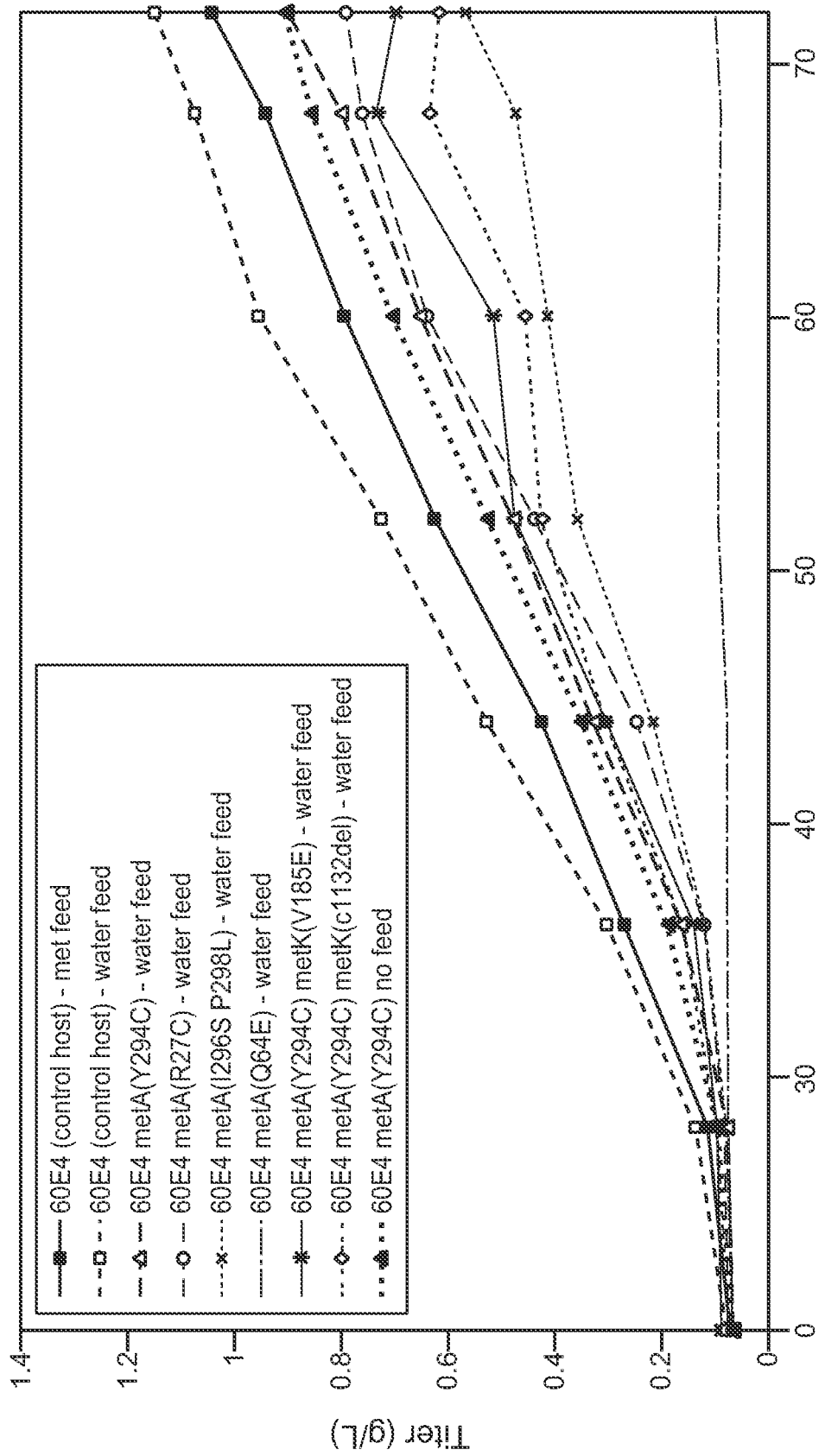

60E4 (control host) - met feed
60E4 (control host) - water feed
60E4 metA(Y294C) - water feed
60E4 metA(R27C) - water feed
60E4 metA(I296S P298L) - water feed
60E4 metA(Q64E) - water feed
60E4 metA(Y294C) metK(V185E) - water feed
60E4 metA(Y294C) metK(c1132del) - water feed
60E4 metA(Y294C) no feed
Titer (g/L)
Time (Hour)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
30
40
50
60
70

FIG. 16B

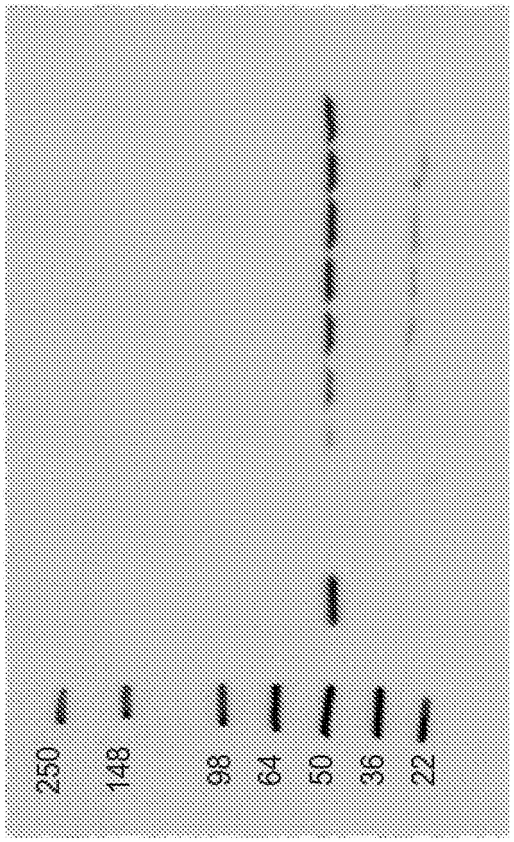


FIG. 17B

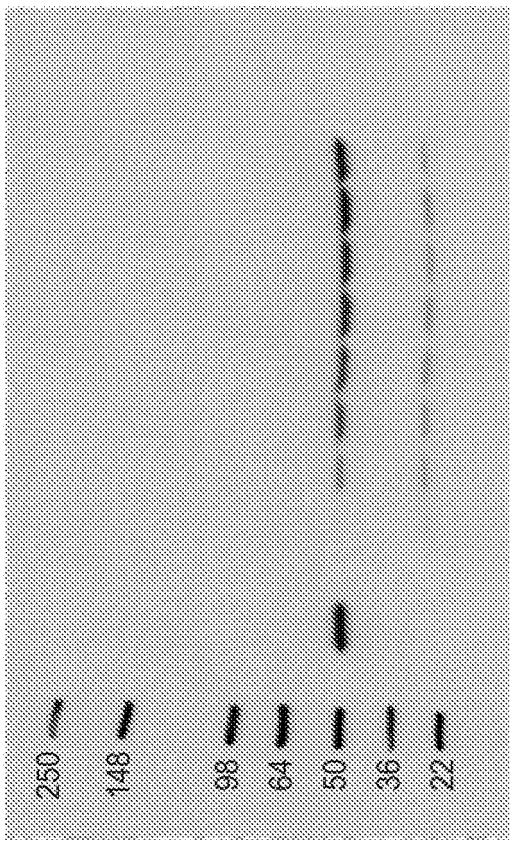


FIG. 17A

GATATCCAGTTGACCCAGTCCC
CGAGCTCCCTGTCCGCCTCTGTGGGCGATAGGGTCACCATCACCTGCAGCGCAAGTCAGG
ATATTAGCAACTATTTAAACTGGTATCAACAGAAACCAGGAAAAGCTCCGAAAGTACTGA
TTTACTTCACCTCCTCTCTCCACTCTGGAGTCCCTTCTCGCTTCTCTGGATCCGGTTCTG
GGACGGATTTCACTCTGACCATCAGCAGTCTGCAGCCAGAAGACTTCGCAACTTATTACT
GTCAACAGTATAGCACCGTGCCGTGGACGTTTGGACAGGGTACCAAGGTGGAGATCAAAC
GAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGCAGTTGAAATCTG
GAACTGCTTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGCCAAAGTACAGT
GGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCACAGAGCAGGACA
GCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGCAGACTACGAGA
AACACAAAGTCTACGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCCGTCACAAAGA
GCTTCAACAGGGGAGAGTGT

FIG. 18A

GAGGTTC
AGCTGGTGGAGTCTGGCGGTGGCCTGGTGCAGCCAGGGGGCTCACTCCGTTTGTCCTGTG
CAGCTTCTGGCTACGACTTCACGCACTACGGTATGAACTGGGTCCGTCAGGCCCCGGGTA
AGGGCCTGGAATGGGTTGGATGGATTAACACCTATACCGGTGAACCGACCTATGCTGCGG
ATTTCAAACGTCGTTTCACTTTTTCTTTAGACACCTCCAAAAGCACAGCATACCTGCAGA
TGAACAGCCTGCGCGCTGAGGACACTGCCGTCTATTACTGTGCAAAGTACCCGTACTATT
ATGGGACGAGCCACTGGTATTTCGACGTCTGGGGTCAAGGAACCCTGGTCACCGTCTCCT
CGGCCTCCACCAAGGGCCCATCGGTCTTCCCCCTGGCACCCTCCTCCAAGAGCACCTCTG
GGGGCACAGCGGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGT
CGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCT
CAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACCCAGA
CCTACATCTGCAACGTGAATCACAAGCCCAGCAACACCAAGGTCGACAAGAAAGTTGAGC
CCAAATCTTGTGACAAAACTCACCTC

FIG. 18B

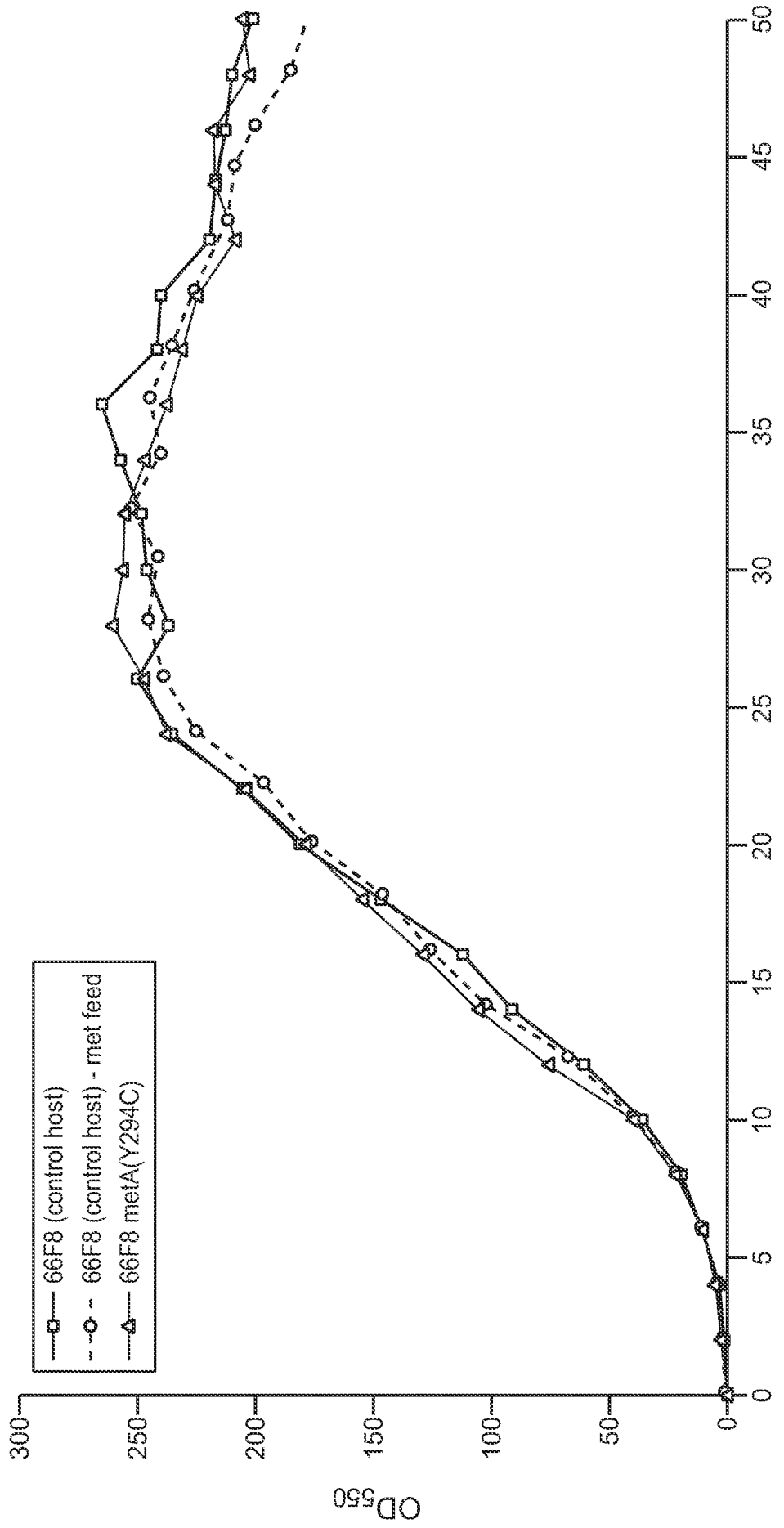

66F8 (control host)
66F8 (control host) - met feed
66F8 metA(Y294C)
OD550
Time (Hour)
0
50
100
150
200
250
300
0
5
10
15
20
25
30
35
40
45
50

FIG. 19A

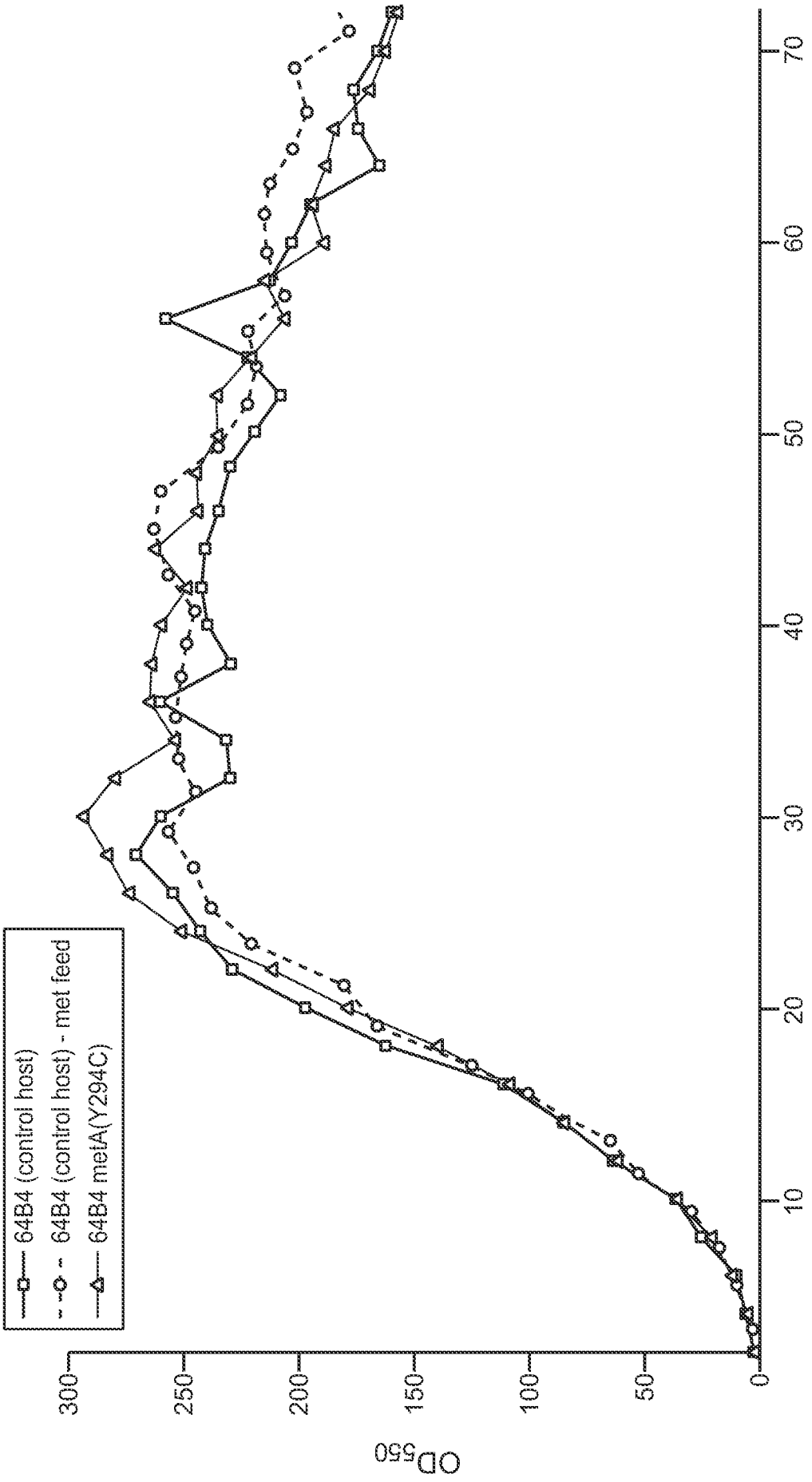

64B4 (control host)
64B4 (control host) - met feed
64B4 metA(Y294C)
OD550
300
250
200
150
100
50
0
10
20
30
40
50
60
70
Time (Hour)

FIG. 19B

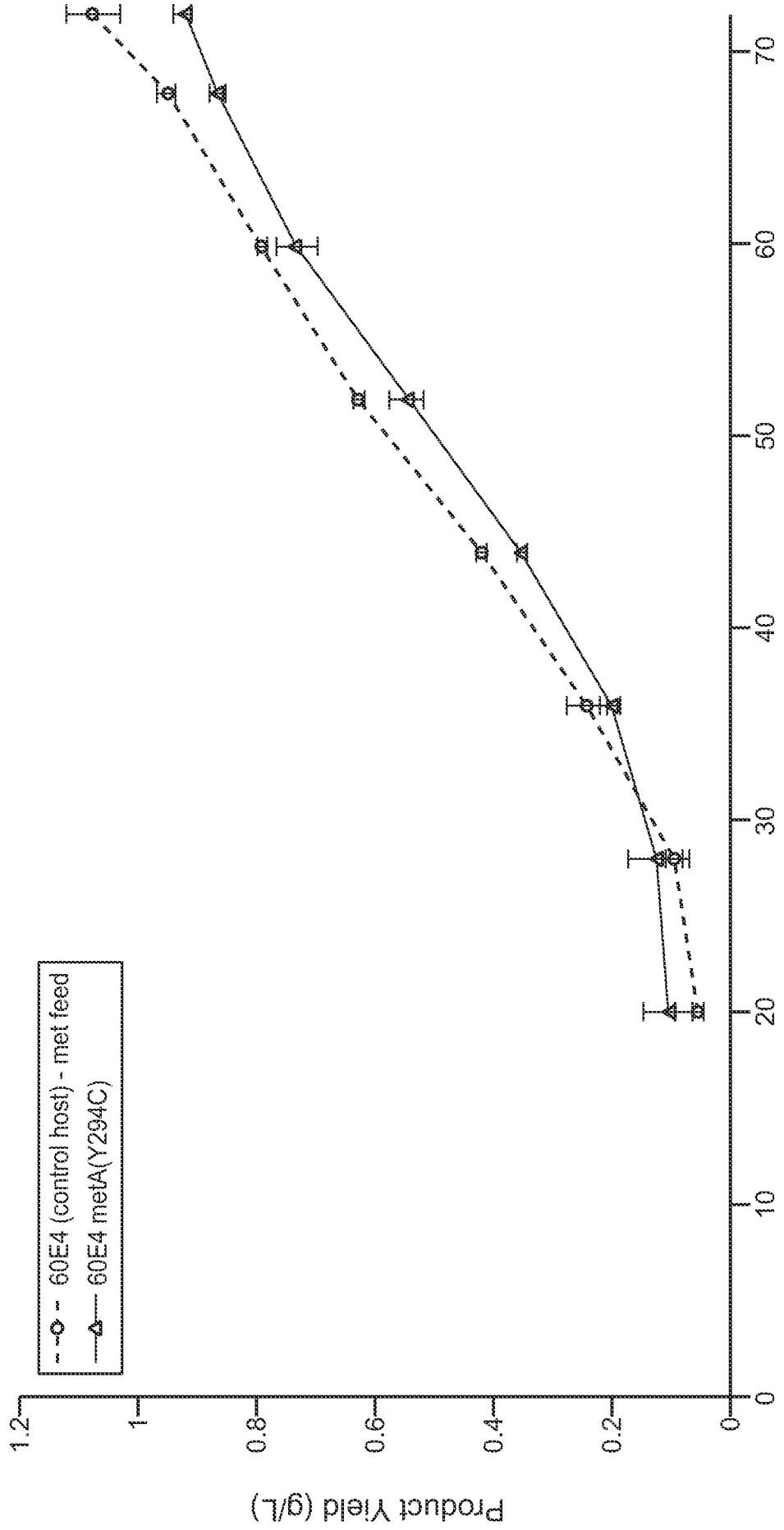

60E4 (control host) - met feed
60E4 metA(Y294C)
Product Yield (g/L)
Time (Hour)
0
0.2
0.4
0.6
0.8
1
1.2
0
10
20
30
40
50
60
70

FIG. 20A

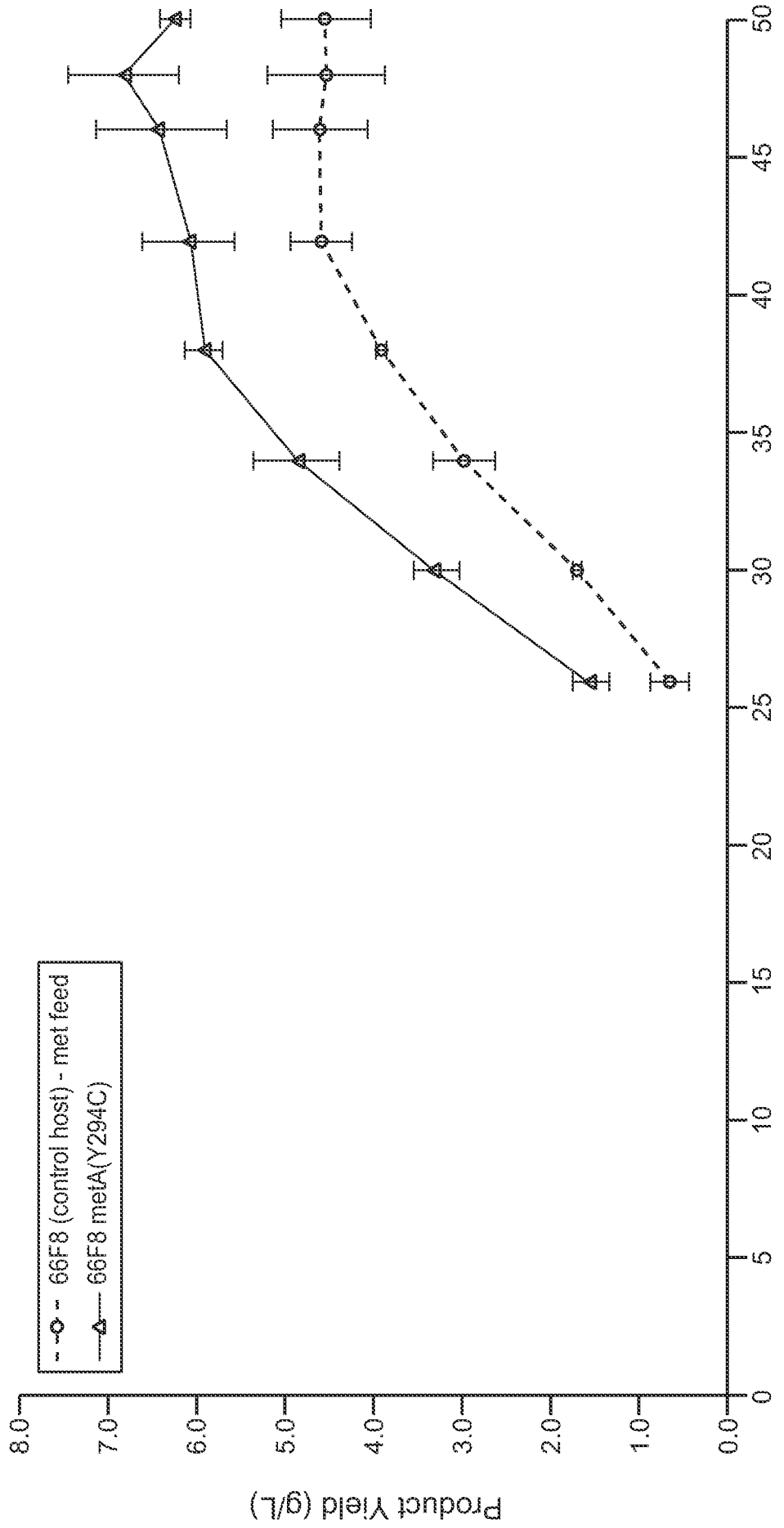

66F8 (control host) - met feed
66F8 metA(Y294C)
Product Yield (g/L)
Time (Hour)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0
5
10
15
20
25
30
35
40
45
50

FIG. 20B

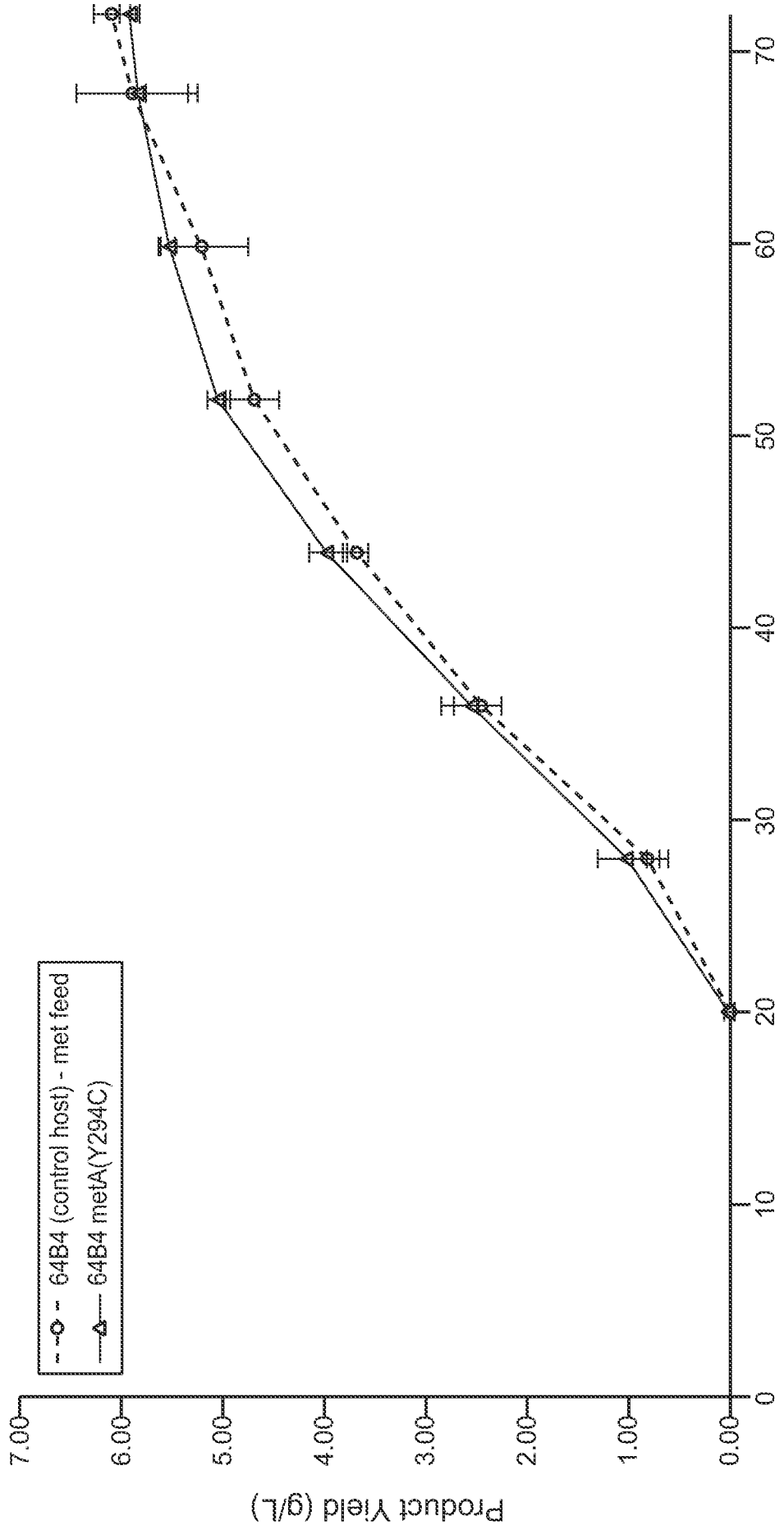

64B4 (control host) - met feed
64B4 metA(Y294C)
Product Yield (g/L)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0
10
20
30
40
50
60
70
Time (Hour)

FIG. 20C

DIQLTQSPSSLSASVGDRVTITCSASQDISNYLNWYQQKPGKAPKVLIYFTSSLHSGVPS
RFSGSGSGTDFTLTISSLQPEDFATYYCQQYSTVPWTFGQGTKVEIKRTVAAPSVFIFPP
SDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYSLSSTLT
LSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

FIG. 21A

EVQLVESGGGLVQPGGSLRLSCAASGYDFTHYGMNWVRQAPGKGLEWVGWINTYTGEPTY
AADFKRRFTFSLDTSKSTAYLQMNSLRAEDTAVYYCAKYPYYYGTSHWYFDVWGQGTLVT
VSSASTKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVL
QSSGLYSLSSVVTVPSSSLGTQTYICNVNHKPSNTKVDKKVEPKSCDKTHL

FIG. 21B

DIQVTQSPSSLSASVGDRVTITCITSTDIDDDMNWYQQKPGKVPKLLISGGNTLRPGVPS
RFSGSGSGTDFTLTISSLQPEDVATYYCLQSDSLPYTFGQGTKVEIKRTVAAPSVFIFPP
SDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYSLSSTLT
LSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

FIG. 22A

EVQLVQSGPELKKPGASVKVSCKASGYTFTNYGMNWVRQAPGQGLEWMGWINTYTGETTY
ADDFKGRFVFSLDTSVSTAYLQISSLKAEDTAVYYCEREGGVNNWGQGTLVTVSSASTKG
PSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSL
SSVVTVPSSSLGTQTYICNVNHKPSNTKVDKKVEPKSCDKTHT

FIG. 22B

DIQMTQSPSSLSASVGDRVTITCKSSQSLLYTSSQKNYLAWYQQKPGKAPKLLIYWASTR
ESGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQYYAYPWTFGQGTKVEIKRTVAAPS
VFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYS
LSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

FIG. 23A

EVQLVESGGGLVQPGGSLRLSCAASGYTFTSYWLHWVRQAPGKGLEWVGMIDPSNSDTRF
NPNFKDRFTISADTSKNTAYLQMNSLRAEDTAVYYCATYRSYVTPLDYWGQGTLVTVSSA
STKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSG
LYSLSSVVTVPSSSLGTQTYICNVNHKPSNTKVDKKVEPKSCDKTHTCPPCPAPELLGGP
SVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNS
TYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPREPQVYTLPPSREEM
TKNQVSLSCAVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLVSKLTVDKSRWQ
QGNVFSCSVMHEALHNHYTQKSLSLSPGK

FIG. 23B

DKTHTCPPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVD
GVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK
GQPREPQVYTLPPSREEMTKNQVSLWCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDS
DGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

FIG. 23C