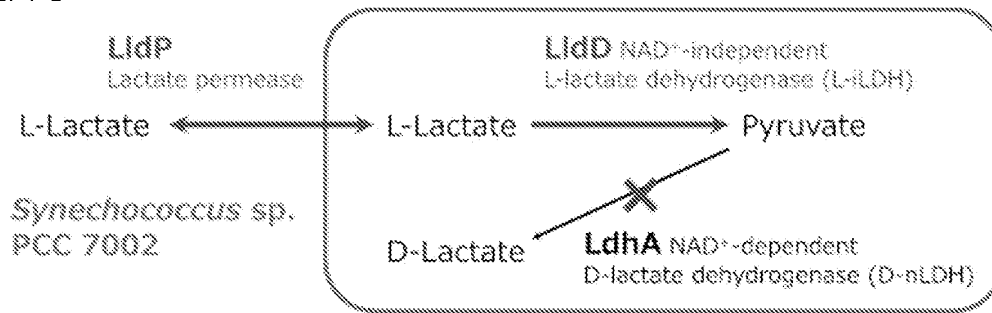


[図1]



[図2]

***E. coli* LldD**

```
>NP_418062.1      L-lactate      dehydrogenase
[Escherichia coli str. K-12 substr. MG1655]
MIISAASDYRAAAQRILPPFLFHYMDGGAYSEYTLRRNVEDLSEVALR
QRILKNMSDLSLETTLFNEKLSMPVALAPVGLCGMYARRGEVQAQAA
DAHGIPFTLSTVSVCPIEEVAPAIKRPMWFQLYVLRDRGFMARNALERA
KAAGCSTLVFTVDMPTPGARYRDAHSGMSGPNAAMRRYLQAVTHPQWA
WDVGLNGRPHDLGNISAYLGKPTGLEDYIGWLGNNFDPSISWKDLEWI
RDFWDGPMVIKGIIDPEDARDAVRFGADGIVVSNHGGRLDGVLSAR
ALPAIADAVKGDIAILADSGIRNGLDVVRMIALGADTVLLGRAFLYAL
ATAGQAGVANLLNLIKEMKVAMTLTGAKSISEITQDSLVOGLGKELP
AALAPMAKGNAA*
```

[図3]

***E. coli* LldP**

```
>NP_418060.1 lactate/glycolate:H(+) symporter LldP
[Escherichia coli str. K-12 substr. MG1655]
MNLWQQNYDPAGNIWLSSLIASLPILFFFFALIKLKLKGYVAASWTVAIA
LAVALLEYKMPVANALASVVYGYGLWPPIAWIIIAAVFVYKISVKTGQF
DIIRSSILSITEDQRLQMLIVGFCFGAFLEGAAGFGAPVAITAALLVGLG
FKPLYAAGLCLIVNTAPVAFGAMGIPILVAGQVTGIDSFEIGQMVGRLP
FMTIIVLFWIMAIMDGWRGIKETWPAVVVAGGSFAIAQYLSSNFIGPELP
DIISLVSLCLTLFLKRWQPVVRVFRFGDLGASQVDMTLAHTGYTAGQVL
RAWTPFLFLTATVTLWSIPPEKALFASGGALYEWVINIPVFYLDKLVARM
PPVVSEATAYAAVFKFDWFSATGTAILFAALLSIVWLKMKPSDAISTFGS
TLKELALPIYSIGMVLAFAFISNYSGLSSTLALALAHTGHAFTFFSPFLG
WLGVFLTGSSTSSNALFAALQATAAQQIGVSDLLLVAANTTGGVTGKMIS
PQSIAIACAAVGLVGKESDLERFTVKHSLIFTICIVGVITTLQAYVLTWMI
P*
```

[図4]

E. coli *lldD* (codon optimized)

ATGATCATCAGTGCCTCTGACTATCGAGCAGCTGCTCAGCGAATTCTACCTCCCTTCCTGTTCC
 ACTACATGGATGGTGGTGCCTACTCGGAGTACACCCCTCGGCCGTAATGTGAGGATCTCAGTGAAGT
 GGGCTGCGGCGAGCGEATTCTGAAGAACATGAGCGACCTCTCCTTGGAAACACCCTGTTCAACGAA
 AAATCTCTCGATGCCGGTTGGCGTAGCGCCAGTAGTCTCTGTGGCATGTACGCCCGTCCGGGTGAGG
 TGCAAGCCGCCAAAGCCGCTGATGCCCATGGAATTCATTACTTTATCGACGGTGTCCGGTCTGCCC
 GATTGAAGAAGTTGCTCCGGCGATCAAGCGACCAATGTGGTTTCAACTCTACGTCCTGCCGATCGC
 GGCTTCATGCGGAATGCCCTTGAGCGGGCTAAAGCGGCTGGCTGCAGCAGCTGGTCTTCACGGTGC
 ATATGCCCTACTCCCGGCGCTCGCTATCGCGATGCCCACTCCGGGATGTCCGGCCCAACGCAGCGAT
 GCGCGCTATCTCCAGGCAGTCACCCATCCCCAGTGGGCTTGGGATGTTGGCCTCAATGGACGTCCC
 CACGATCTAGGCAATATTTTACGCTTATCTGGGTAAGCCACGGGTCTGGAGGACTACATCGGGTGGC
 TGGGTAACAACTTTGATCCACGATCAGCTGGAAGGATTTAGAGTGGATTGCTGACTTTTGGGACGG
 TCCGATGGTGATCAAGGCATTCTCGATCCGGAAGACGCGGTGACGCGATTCCGTTTGGCGCGAT
 GGCATCGTGGTCAGCAATCATGGCGGTCCGCCAATGGATGGCGTCTGTCATCTGCTCGAGCATGTC
 CTGCTATCGCTGATGCTGTCAAAGCGGATATCGCGATCTTGGCGGACAGTGGAAATTCGCAATGGGGCT
 TGATGTGGTTCCGATGATTGCCCTTGGGAGCAGACACAGTGTCTTGGGGCGGCGCTTTCTCATGCC
 CTTGGCACTCCCGGCCAAGCGGGCGCTTGCCAATTTGCTCAACCTGATTGAGAAAGAAATGAAGGTGC
 CCATGACCTTGACAGGTGCGAAAGCATTTCTGAAATCACCAAGATAGTTTGGTACAGGGGCTGGG
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[図5]

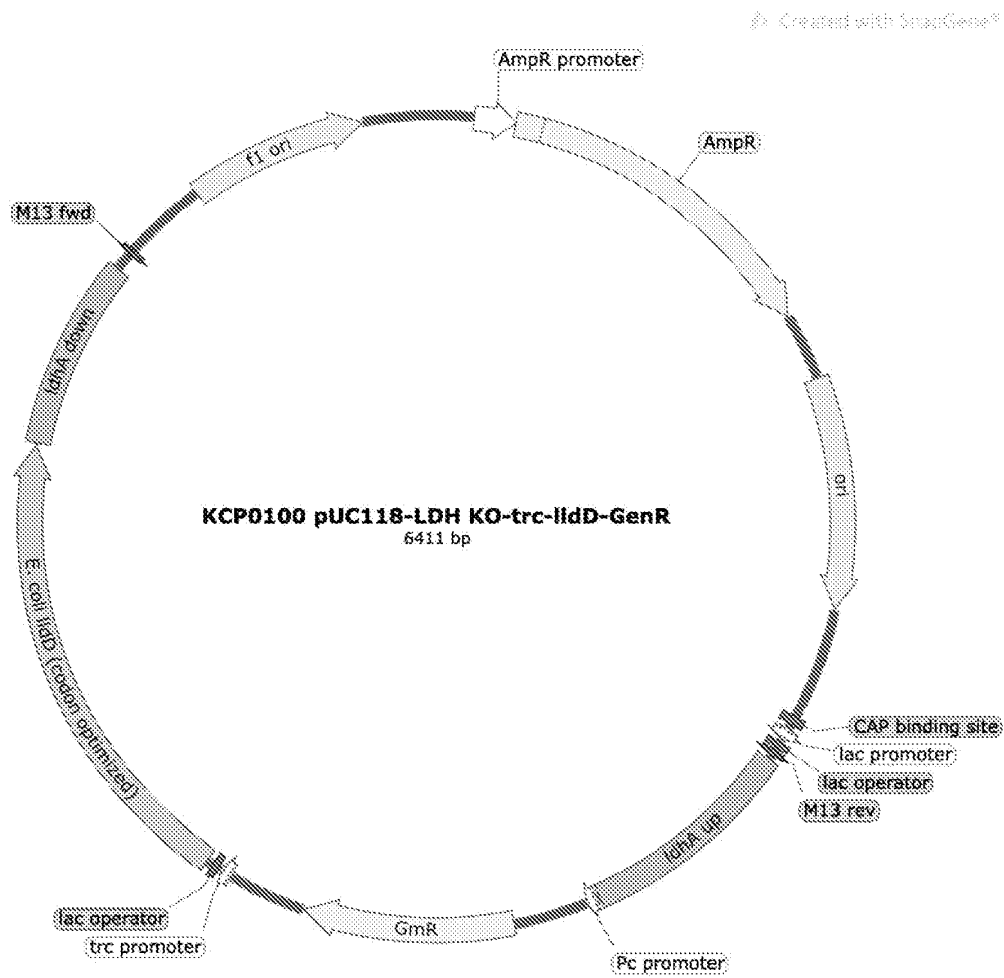
E. coli *lldP* (codon optimized)

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 CTGGCGCTGCTCTCTACAAAATGCCGGTCGGCAATGCCCTTAGCGTCTCTTGTCTATGGCTTTTTFACGGCCTTTG
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 TGGATCATGGCGATTATGATGGCTGGCGAGGTATCAAGGAAACCTGGCGGGCGGTAGTGGTGGCGCGGGGAGCTTC
 GCGATCGCCAGTATCTCAGCAGCAACTTTATCGGTCTCTGAACGCGCGATATTATTTCTAGTCTGGTTAGCTTGCTT
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 GTACGCTCTCGAGCATACCGCCTTTCAAAGCACTGTTTGCCTCGGGAGGTGCCCTCTACGAGTGGGTGATTAAATATT
 CCGGTGCCCTATCTTACAAAGTTGGTGGCACGGATGCCCGCAGTTGTGACGCAAGCCACAGCCTACGCGCAGTGTTC
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 CCGAGCGATGCGATCAGTACCTTGGGCTCTACGCTAAAAGAGTTAGCTCTACCGATCTACAGCATTGGGATGGTCTTA
 GCATTTGCCCTTTATCAGCAATTATTCAGGCGCTGTCTTCAACACTGGCCTTGGCTTTGGGCCATACAGGCCACGCGTTC
 ACCTTTTCTCGCCCTTTTGGGTGGCTGGCGCTCTTCTGACCGGTTCCGACACCAGCTCCAACGCTTTGTTCCG
 GCACTGCAGGCTACTGCAAGCCAAACAGATTGGTGTCAAGTATTGCTGTTGGTGGCTGCTAACACGACCGCGCGCTG
 ACTGGCAAGATGATCTCCCCCAGTCGATCGCAATCGCTTGTGCTGCTGTTGGGCTTAGTTGGCAAGAAAGCGATTG
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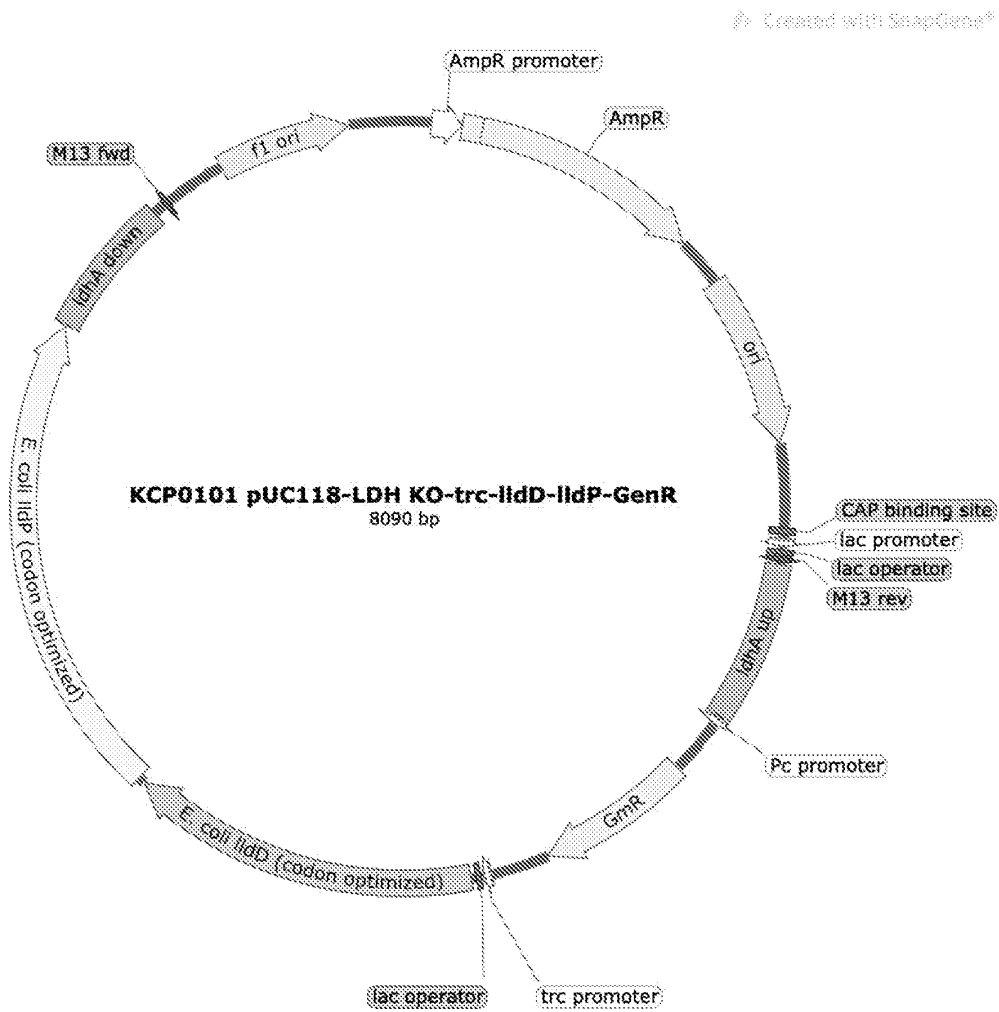
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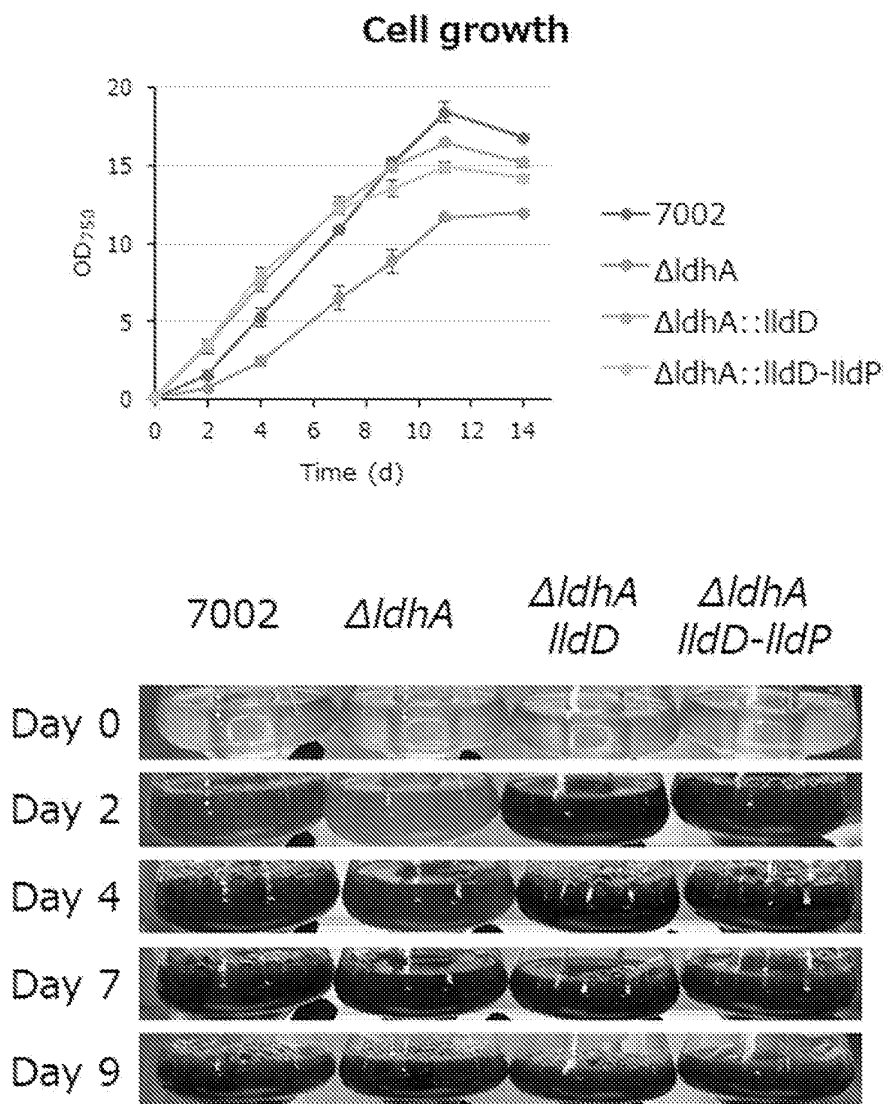
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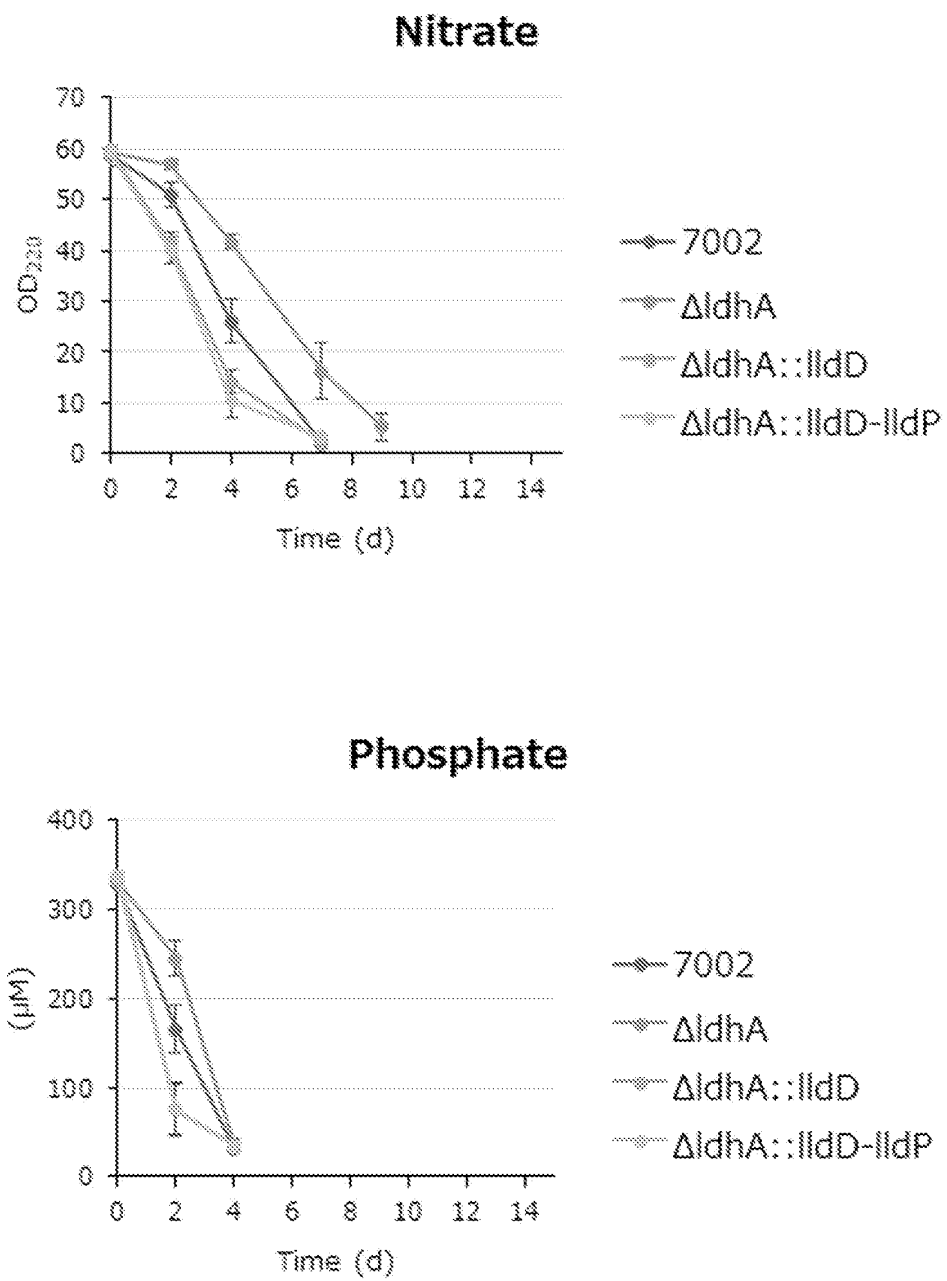
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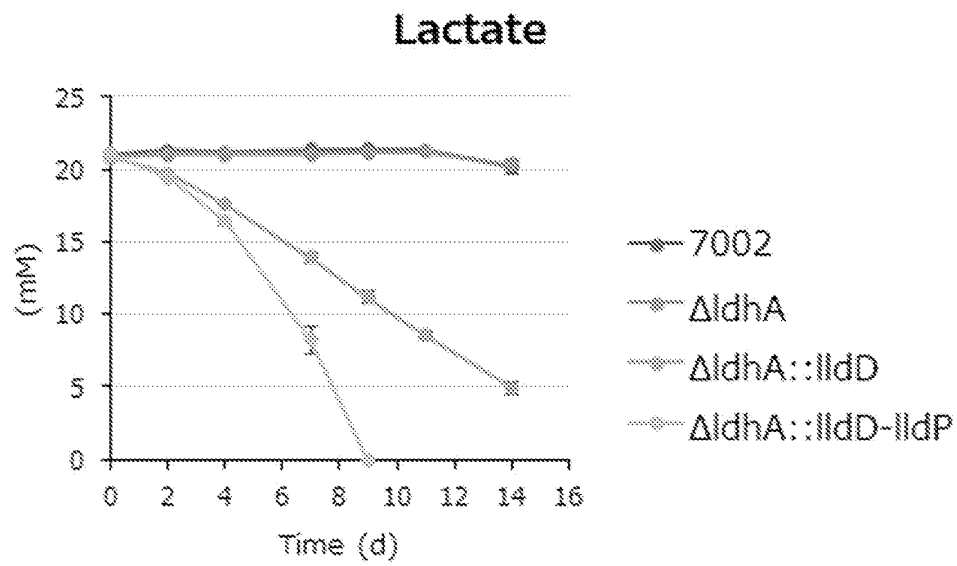
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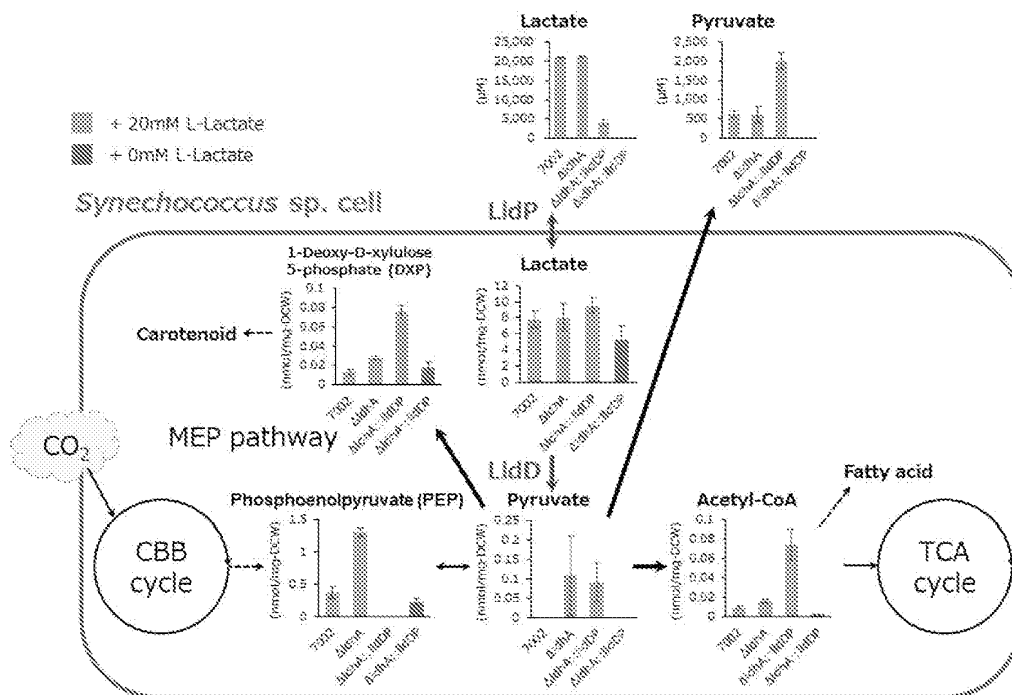
[図10]



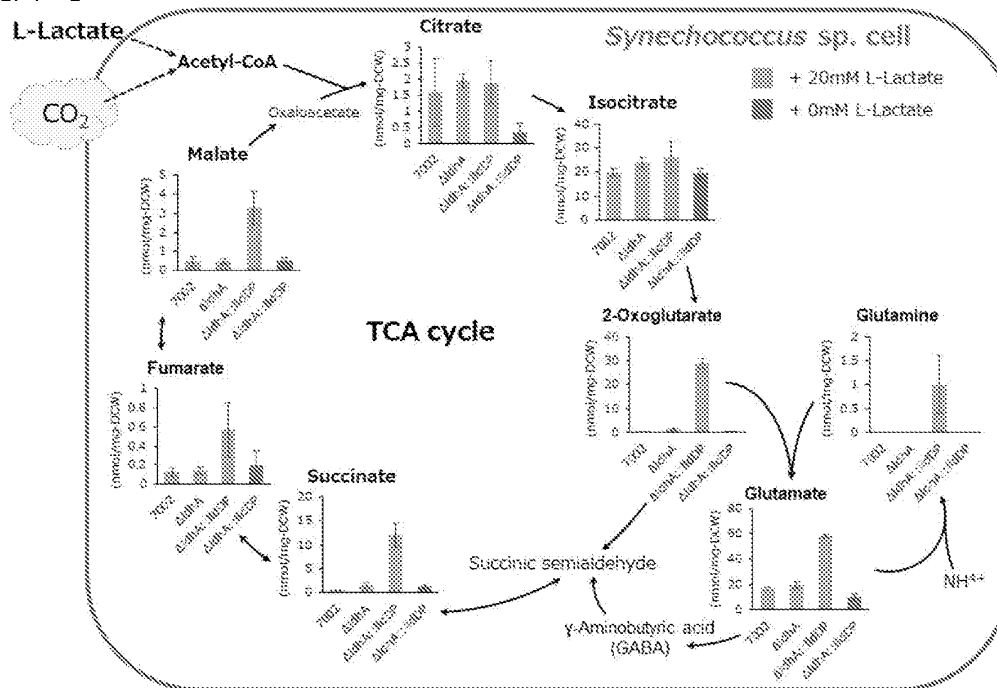
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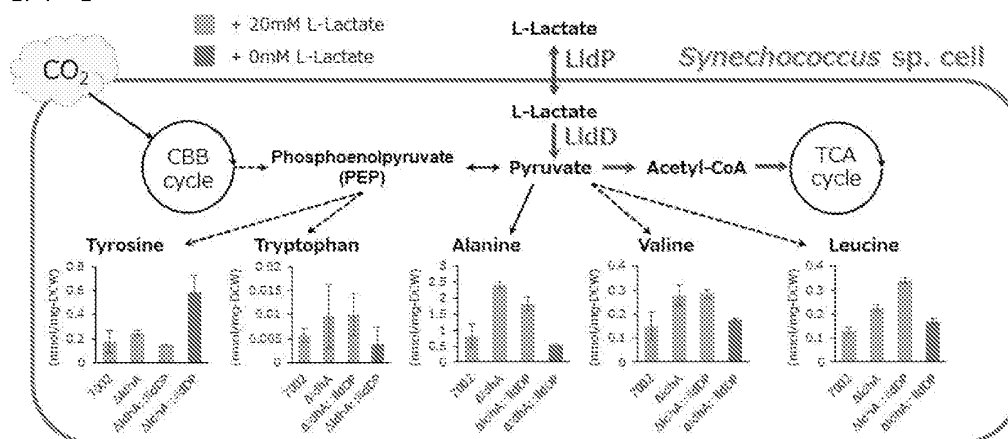
[図12]



[図13]

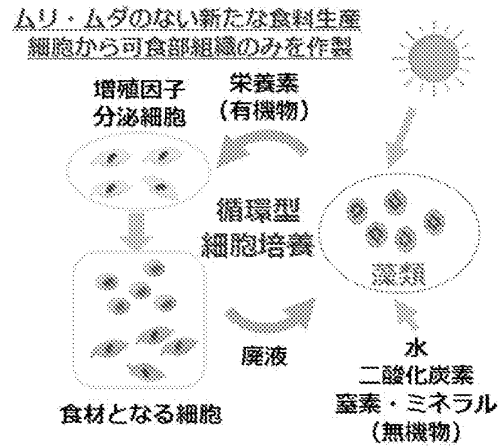


[図14]

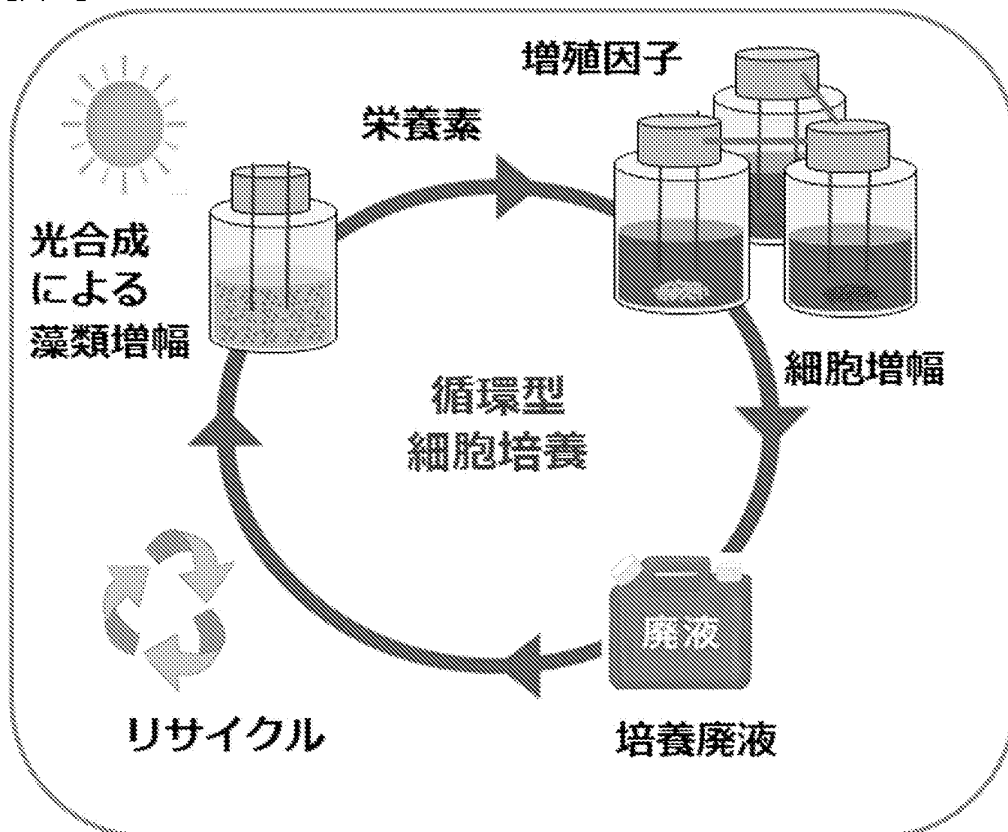


[図15]

藻類を栄養源とした細胞培養と組織化による ムリ・ムダのない食料生産



[図16]



[図17]

培養肉の作製プロセス

