SEQUENCE LISTING

<110> Myriant Corporation
Sillers, Ryan
Spencer, Michelle
Yocum, R. Rogers
Hermann, Theron

<120> IMPROVED MUCONIC ACID PRODUCTION FROM GENETICALLY ENGINEERED MICROORGANISMS

<130> MC2017-01PCT

<150> US 62/302558
<151> 2016-03-02

<160> 94

<170> PatentIn version 3.5

<210> 1
<211> 195
<212> DNA
<213> Bacillus subtilis

<220>
<221> promoter
<222> (1)..(195)
<223> The P15 promoter from Bacillus subtilis phage SP01, with a stem and loop added just downstream from the transcription start site.

<400> 1

gctattgacg acagctatgg ttcactgtcc accaaccaaa actgtgctca gtaccgccaa 60

tatttctccc ttgaggggta caaagaggtg tccctagaag agatccacgc tgtgtaaaaa 120

ttttacaaaa aggtattgac tttccctaca gggtgtgtaa taatttaatt acaggcgggg 180

gcaacccccgc ctgtt 195

<210> 2

<211> 164

<212> DNA

<213> Bacillus subtilis

<220>

<221> promoter

<222> (1)..(164)

<223> The P26 promoter from Bacillus subtilis phage SP01

<400> 2

gcctacctag cttccaagaa agatatccta acagcacaag agcggaaaga tgttttgttc 60

tacatccaga acaacctctg ctaaaattcc tgaaaaattt tgcaaaaagt tgttgacttt 120

atctacaagg tgtggtataa taatcttaac aacagcagga cgct 164

<210> 3

<211> 91

<212> DNA

<213> Escherichia coli

<220>

<221> promoter

<222> (1)..(91)

<223> The PR promoter from Escherichia coli phage

<400> 3

acgttaaatc tatcaccgca agggataaat atctaacacc gtgcgtgttg actattttac 60

ctctggcggt gataatggtt gcatgtacaa g 91

<210> 4

<211> 359

<212> PRT

<213> Neurospora crassa

<220>

<221> PEPTIDE

<222> (1)..(359)

<223> Protein sequence of 3-dehydroshikimate dehydratase from Neurospora crassa encoded by the qa-4 gene.

<400> 4

Met Pro Ser Lys Leu Ala Ile Ser Ser Met Ser Leu Gly Arg Cys Phe

1 5 10 15

Ala Gly His Ser Leu Asp Ser Lys Leu Asp Ala Ala Gln Arg Tyr Gly
20 25 30

Tyr Leu Gly Ile Glu Leu Phe Tyr Glu Asp Leu Val Asp Val Ala Glu
35 40 45

His Leu Ser Asn Glu Arg Pro Ser Pro Glu Gly Pro Phe Val Glu Ala
50 55 60

Gln Ile Ala Ala Ala Arg His Ile Leu Gln Met Cys Gln Ala Arg Gly
65 70 75 80

Leu Glu Val Val Cys Leu Gln Pro Phe Met His Tyr Asp Gly Leu Asn
85 90 95

Asp Arg Ala Glu His Glu Arg Arg Leu Glu Lys Leu Ala Leu Trp Ile
100 105 110

Glu Leu Ala His Glu Leu His Thr Asp Ile Ile Gln Ile Pro Ala Asn
115 120 125

Phe Leu Pro Ala Asn Gln Val Ser Asp Asn Leu Asp Leu Ile Val Ser
130 135 140

Asp Leu Cys Lys Val Ala Asp Ile Gly Ala Gln Ala Leu Pro Pro Ile
145 150 155 160

Arg Phe Ala Tyr Glu Ser Leu Cys Trp Ser Thr Arg Val Asp Leu Trp
165 170 175

Glu Arg Cys Trp Asp Ile Val Gln Arg Val Asp Arg Pro Asn Phe Gly
180 185 190

Ile Cys Leu Asp Thr Phe Asn Ile Leu Gly Arg Ile Tyr Ala Asp Pro
195 200 205

Thr Ser Pro Ser Gly Arg Thr Pro Asn Ala Lys Glu Ala Val Arg Lys
210 215 220

Ser Ile Ala Asn Leu Val Ser Arg Val Asp Val Ser Lys Val Phe Tyr
225 230 235 240

Val Gln Val Val Asp Ala Glu Arg Leu Ser Lys Pro Leu Leu Pro Gly
245 250 255

His Pro Tyr Tyr Asn Pro Glu Gln Pro Ala Arg Met Ser Trp Ser Arg
260 265 270

Asn Cys Arg Leu Phe Tyr Gly Glu Thr Glu Tyr Gly Ala Tyr Leu Pro
275 280 285

Val Lys Glu Val Ala Arg Ala Leu Phe His Gly Ile Gly Phe Glu Gly
290 295 300

Trp Val Ser Leu Glu Leu Phe Asn Arg Arg Met Ser Glu Glu Gly Pro
305 310 315 320

Glu Val Pro Glu Glu Leu Ala Met Arg Gly Ala Ile Ser Trp Ala Lys
325 330 335

Leu Val Gln Asp Leu Arg Ile Pro Val Glu Gly Pro Leu Val Thr Met
340 345 350

Pro Arg Val Ser Ala Ser Leu
355

<210> 5
<211> 2160

<212> DNA

<213> Neurospora crassa

<220>

<221> gene

<222> (1)..(2160)

<223> Genomic DNA sequence of the qa-4 gene from Neurospora crassa plus surrounding sequences.

<400> 5

gaattcggga aatggaatct tacctgggaa ccgaaatcac agtccgggta ggttatagag 60

catatagtga actgtcaaag ttctagacct ggaccagcca cttggagtcg ttgttttagt 120

tatacctaca ttcactcact gttgactttc aatcatactt acttagacgg agcaacgcgc 180

cagaatccaa attgttgcat agttgcggta tcaccaagtg gcttcccata atagtttgcc 240

attcgatgag acagctaact ggaagaccgg tactcgcagg ttgcacgatt acacggaagg 300

attcggtatt ccgtgtttca tctgtcaaag tccctttcca tatgaatccg aggtactatg 360

actggatctc gatacaagct ggccagcgag gtgcctgcct tgacaggctg tcaactgcgg 420

gacggccggc taagtgttta acacgcaagg gtggaagatg tctcgtcccg tcatccaaga 480

ccgtcaacat tcgaggccat ctgatcgttg aagagatgct aaatcttgtg aaacgctcat 540

aggtcgctta ccttcggccc acccgttaat gctttattcc gctgagcaaa cttcggcttc 600

catcccgcgg ttcaccgttt acatcactta tcgttgcggt tattggccga ttcttcgcaa 660

accgaaacga tgacatcccg aatatctgca atacaccgcc acggccggcg tctttatcac 720

acctcctatg ggagacgaaa gtgccttgat acccctagtc atttgaagat tcaggatggg 780

agacggctgg ccgcttgcgg agttacgttc gagtcttggt cgcaggaacg cttgccgtat 840

tgaatgagac cccgagaagg tcaaatcaaa tcttggaaga ccccaactgc ttcctcattg 900

ccttcactcc ccatatcaat ggggcacatc ctgtgactac cttggtgctt tatttcctca 960

ccatttggcg atacaagctc aaggacaccg aggtgatata cagttcttca aggacactat 1020

ctcacctcaa tatcaagaac cagtctcatc atctcttatt tctccaggat ccccccacca 1080

acaacatcgg ctttttttt tcccctattc tcaagaccca tcaagacgct cacttcgctg 1140

agcctttcgc catgccgtca aagctagcca ttagttccat gtccctaggg cgctgctttg 1200

ccggccactc tctggacagc aagcttgatg ccgctcaacg atacggctat cttggtatcg 1260

agctttttta tgaggatctg gtcgacgttg cagagcattt gtcgaacgag cgtccctctc 1320

ccgaaggccc ttttgtcgaa gctcagatag ccgccgctcg tcatattctc cagatgtgtc 1380

aagccagggg gcttgaggtc gtctgcctcc agcctttcat gcactacgac ggccttaacg 1440

acagggcaga acatgagcgt cgtctggaga agctagcact atggattgag ctcgctcatg 1500

agcttcacac cgacatcatt cagatcccag ccaacttcct ccctgccaac caagtcagtg 1560

acaacctcga cctgattgtc tcagatcttt gcaaggtggc cgatattgga gctcaagctt 1620

tgcccctat ccgctttgcc tacgagagtc tttgctggag cacccgtgtc gacctctggg 1680

agcgctgctg ggacatcgta caacgcgttg accgccccaa ctttggcatt tgccttgaca 1740

ccttcaacat cctcggccgc atctatgccg accctacatc tcctagcggt aggacaccca 1800

acgcaaaaga ggcagtcagg aagtccatcg ccaacttggt ctcgcgcgtg gatgtctcca 1860

aagtcttcta cgtccaggtg gttgacgccg agaggctgag caagccacta ctgcccggtc 1920

acccgtatta caatccagag cagccggcga ggatgagctg gtcgcgcaat tgtagactgt 1980

tctacggcga aacagaatat ggtgcgtatc ttcccgtgaa ggaggttgct cgagcccttt 2040

tccacggcat tggtttcgag ggctgggtca gtttggagct tttcaaccgc agaatgtctg 2100

aggagggacc tgaagtgccg gaggaacttg ccatgagagg cgctatctcg tgggccaagt 2160

<210> 6
<211> 348
<212> PRT
<213> Aspergillus niger

<220>
<221> PEPTIDE
<222> (1)..(340)

<223> Protein sequence of 3dehydroshikimate dehydratase from Aspergillus nidulans. encoded by the qutC gene

<400> 6

Met Pro Ala Asn Leu Lys Ile Gly Ile Pro Thr Val Ser Leu Ser Lys
1 5 10 15

Pro Gly Leu His Ser Leu Asp His Lys Leu Arg Ser Ala Ala His Gly
20 25 30

Phe Ala Gly Ile Glu Leu Phe Ile Asp Asp Leu Ser His Phe Ala Ser
35 40 45

Ser Ser Phe Asn Gly Ser Leu Thr Gln Ala Ala Lys Tyr Ile Ser Ser
50 55 60

Leu Ala Lys Gln Leu Asn Leu Thr Phe Ile Cys Leu Gln Pro Phe Gly
65 70 75 80

Phe Tyr Glu Gly Leu Val Asp Thr Asn Gln Ser Thr Tyr Leu Leu Thr
85 90 95

Glu Lys Leu Pro Leu Trp Phe Ala Ile Ala Arg Ile Ile Gly Thr Asp
100 105 110

Leu Ile Gln Ile Pro Ala Asn Phe Leu Gln Asn Asp Pro Val Thr Gly
115 120 125

Ala Ala Arg Thr Ser Gly Asp Ile Arg Leu Ile Val Ser Asp Leu Gln
130 135 140

Thr Ile Ala Asp Ile Gly Val Lys Gln Gly Phe Arg Phe Val Tyr Glu
145 150 155 160

Ala Leu Cys Trp Ser Thr His Val Asp Thr Trp Glu Ala Ala Trp Asn
165 170 175

Val Val Lys Leu Val Asp Arg Glu Asn Phe Gly Ile Cys Leu Asp Ser
180 185 190

Phe Asn Thr Arg Thr Pro Leu Pro Ser Leu Gly Arg Arg Arg Met Leu
195 200 205

Ser Lys Pro Trp Pro Ser Pro Trp Arg Arg Ser Val Leu Ser Ser Pro
210 215 220

Val Glu Asn Trp Thr Ser Gly Lys Ser Ser Thr Ser Ser Leu Ser Met

225 230 235 240

Ala Ser Gly Cys Arg Arg Arg Trp Thr Arg Ser Thr Pro Phe Met Trp
245 250 255

Arg Ala Asn Pro Arg Arg Met Ser Trp Ser Arg Asn Ala Arg Leu Phe
260 265 270

Pro Cys Glu Glu Glu Arg Gly Gly Tyr Leu Pro Val Leu Glu Ile Ala
275 280 285

Arg Ala Phe Phe Glu Ile Gly Phe Glu Gly Trp Val Ser Leu Glu Leu
290 295 300

Phe Ser Arg Thr Cys Asn Asp Pro Asp Val Asn Thr Val Gly Glu His
305 310 315 320

Ala Arg Arg Gly Met Asp Arg Arg Arg Arg Val Val Ala Ala Leu Gly
325 330 335

Leu Asp Val Glu Val Pro Ala Arg Asn Cys Glu Cys
340 345

<210> 7

<211> 3298

<212> DNA

<213> Aspergillus niger

<220>

<221> gene

<222> (1)..(3298)

<223> Genomic DNA sequence of the qutC gene from Aspergillus nidulans plus surrounding sequences

<400> 7

aagcttggtt tcaagtgatg atatatagtt atgaggatat aatatgaacc gaaagacgat 60

gtttcttgtg aatatttacg tgatagttgt ctgtctaata tggtacagca gtagaacaac 120

tacatacggt cactacttac agccctagtc attccctccc tcgattgcct accatttata 180

cactttgaac atccacaggc ttgcctccct ccatactctc cctaacagct tgaacaactc 240

tgagcgccct caccccatct tcaacgccac agccaactcc tcgctcgcca tcctcaccct 300

ttccactaac aacatcaaca aaatatcccc actgcgcatc aaacggcctc acatcagcat 360

ccttcactga aatctgctgc atcgccaact ccgtattcca gcctttctct ttcccctgtc 420

cacaagaaac atggtcatag ctccagcgcg tcatatcagg cacactgaga ctcgctctgg 480

ttccaagaat tcgataacag tcgcttgcac tcttggaagg agcgggcgga atcgtaggat 540

tctcgcccgt tcctgtttca aagttcaacg gcgaaggcgt cgcgtcgcag atgagaaatg 600

tgcctactat cccagacgca aagcgcagcg tcacagcaca gccttcctcg gcggtatgtt 660

ccgggttctg gcgcatgcgc tgcaggagtg taccctccgc gtagacccta ctgacgggcc 720

caaacagaaa ctgcagcacg tcgatatcgt ggataagatt aatccccagc acgccgccct 780

tcttcttatc tgcgcgccaa gaaccgagcg gcggcgcgaa gtaagaggcc ggcttcagaa 840

gtgtccagag gccgttcact gcaacgacgg tgccgagtga gtctgtctct aacaaagact 900

ttgtggtttg gatgtacgga ttgaagcggc ggtggtggcc gatctggatg ttgatcttcg 960

catccttgcc tctcttctca tctttacatt tctgttcctt gacggtagcg aggaggtgct 1020

cggccgactc cagatcgtca ctgatcggtt tctcaaggag gatattgcgg attccgttct 1080

ccagcagctg gagcgtgacg tccacgtgcg tgtgattggg cgtgctcacg atcgccgcgt 1140

ctggtttccc ggttgtctta ccgacaacgt ctaacataga cgtaatagaa tcatagcaag 1200

gaacgccaaa tgattctgcg accgggattg cagagggtga agggtcaaca aaagcgatca 1260

gctgggttcg tgggtgtcgt tgcacggatt gtgcgtgacg gggcccaata agtccggcac 1320

cgacgatgac aatgaggata ttcttgtcct tttccttgct gcagggcacc attgtgcatg 1380

tcggtggctg gaaataaaca gaacagggat atggtcaagt cggagaatcg gtgcaggata 1440

gaccggctac ttgatgtagg acgacagtcg cgatctaccg agagcgtgag attcactgtg 1500

ggactgattt atgtaatttg aggcgcagca gacttaggga cttgaaatgt ggctgtctgt 1560

ggatgcattt gcggggtatg gagtacagag tgcatacagc tgtgtatatg gagttcctta 1620

cggagagggt gacctggtat ggggagaacg ggcaaaatgc tcacccggca acctctcaaa 1680

gcgtttaccc ggtatactcc tctgatatca atatttccaa tcagcaccta tatcatcacg 1740

acgctctcct gaggattccg tagctaaccg ccctggatcc tacattaata aataagccat 1800

ttgctttttc tgctgcgagt gtgattctca atacgattac gtatcacatg cagattgcct 1860

ttacttcagc tgcatttgat cagccacagc tctaagagca aacataccct acctacctac 1920

ctacttcgcc tagggtacat aatcaccgcc atctcctcct cgatcagtct tcaactcaat 1980

cagctcattc attctattct taatataata tatacctta gatctccagc agagacccga 2040

agagtcggca attcaaaatg cccgcaaacc tcaaaatcgg tatcccaacc gtgtccctgt 2100

caaaaccggg cctgcactct cttgaccata agctccgctc ggccgctcat ggcttcgcgg 2160

ggatcgagct gtttattgat gacctctccc atttcgcctc atcgtcattc aatggctccc 2220

tcactcaagc ggcaaagtat atctcctcgc tcgccaagca acttaacctc acatttatct 2280

gcctgcaacc attcggtttc tacgagggtc tggtggacac aaatcagtcg acgtacctgc 2340

tcactgagaa actcccgctc tggtttgcga tcgcccgcat tataggcaca gatctcatcc 2400

aaatccccgc aaatttcctc cagaatgacc ctgtcaccgg ggctgcacga acaagcggcg 2460

acataaggct tatcgtctca gatctgcaga cgatcgcaga tatcggtgta aagcagggct 2520

tccgctttgt gtacgaggcg ctctgctggt cgacgcatgt cgatacatgg gaagcagcgt 2580

ggaatgtcgt caagctggtt gatagagaga atttcgggat ctgcctggat agcttcaaca 2640

cgcggacccc gcttccgtca ctgggaagac gccggatgct gagcaagccg tggccaagtc 2700

catggagacg ctccgttctc tcgtctccag tggagaactg gacatcagga aaatcttcta 2760

catccagctt gtcgatggcg agcggttgtc ggcgccgctg gacgagaagc acccctttca 2820

tgtggagggc caacccccga agaatgagct ggagtcgcaa tgcgcggtta ttcccctgtg 2880

aagaggagag gggtgggtat cttcctgtgt tggagatcgc gagggcgttc tttgaaatcg 2940

ggttcgaggg gtgggtgagt ctagagctgt tttcaaggac gtgtaatgat cccgatgtga 3000

acacggtggg ggagcatgcg agacgtggga tggatagaag gaggagggtt gttgcggcgc 3060

taggactcga tgttgaggtg ccagcacgta actgtgaatg ttagcatgaa cggcaaggag 3120

agggtggagg tgcaggtgca ggaggagctg gctgttcagc atcggctgta ggtagtggta 3180

tcttgaaagg acgatagggt ttgatctaga gatttttatt ttgtctaatt actggtaatg 3240

atggcctcat gcacgctgtt gaacacgctg tacaacatca ctgttgaaga tgatacct 3298

<210> 8

<211> 502

<212> PRT

<213> Klebsiella pneumoniae

<220>

<221> PEPTIDE

<222> (1)..(502)

<223> Protein sequence of protocatechuate decarboxylase (AroY) from Klebsiella pnemoniae ATCC25597

<400> 8

Met Thr Ala Pro Ile Gln Asp Leu Arg Asp Ala Ile Ala Leu Leu Gln
1 5 10 15

Gln His Asp Asn Gln Tyr Leu Glu Thr Asp His Pro Val Asp Pro Asn
20 25 30

Ala Glu Leu Ala Gly Val Tyr Arg His Ile Gly Ala Gly Gly Thr Val
35 40 45

Lys Arg Pro Thr Arg Ile Gly Pro Ala Met Met Phe Asn Asn Ile Lys
50 55 60

Gly Tyr Pro His Ser Arg Ile Leu Val Gly Met His Ala Ser Arg Gln

65 70 75 80

Arg Ala Ala Leu Leu Leu Gly Cys Glu Ala Ser Gln Leu Ala Leu Glu
85 90 95

Val Gly Lys Ala Val Lys Lys Pro Val Ala Pro Val Val Val Pro Ala
100 105 110

Ser Ser Ala Pro Cys Gln Glu Gln Ile Phe Leu Ala Asp Asp Pro Asp
115 120 125

Phe Asp Leu Arg Thr Leu Leu Pro Ala His Thr Asn Thr Pro Ile Asp
130 135 140

Ala Gly Pro Phe Phe Cys Leu Gly Leu Ala Leu Ala Ser Asp Pro Val
145 150 155 160

Asp Ala Ser Leu Thr Asp Val Thr Ile His Arg Leu Cys Val Gln Gly
165 170 175

Arg Asp Glu Leu Ser Met Phe Leu Ala Ala Gly Arg His Ile Glu Val
180 185 190

Phe Arg Gln Lys Ala Glu Ala Ala Gly Lys Pro Leu Pro Ile Thr Ile
195 200 205

Asn Met Gly Leu Asp Pro Ala Ile Tyr Ile Gly Ala Cys Phe Glu Ala
210 215 220

Pro Thr Thr Pro Phe Gly Tyr Asn Glu Leu Gly Val Ala Gly Ala Leu
225 230 235 240

Arg Gln Arg Pro Val Glu Leu Val Gln Gly Val Ser Val Pro Glu Lys
245 250 255

Ala Ile Ala Arg Ala Glu Ile Val Ile Glu Gly Glu Leu Leu Pro Gly
260 265 270

Val Arg Val Arg Glu Asp Gln His Thr Asn Ser Gly His Ala Met Pro
275 280 285

Glu Phe Pro Gly Tyr Cys Gly Gly Ala Asn Pro Ser Leu Pro Val Ile
290 295 300

Lys Val Lys Ala Val Thr Met Arg Asn Asn Ala Ile Leu Gln Thr Leu
305 310 315 320

Val Gly Pro Gly Glu Glu His Thr Thr Leu Ala Gly Leu Pro Thr Glu
325 330 335

Ala Ser Ile Trp Asn Ala Val Glu Ala Ala Ile Pro Gly Phe Leu Gln
340 345 350

Asn Val Tyr Ala His Thr Ala Gly Gly Gly Lys Phe Leu Gly Ile Leu
355 360 365

Gln Val Lys Lys Arg Gln Pro Ala Asp Glu Gly Arg Gln Gly Gln Ala
370 375 380

Ala Leu Leu Ala Leu Ala Thr Tyr Ser Glu Leu Lys Asn Ile Ile Leu
385 390 395 400

Val Asp Glu Asp Val Asp Ile Phe Asp Ser Asp Asp Ile Leu Trp Ala
405 410 415

Met Thr Thr Arg Met Gln Gly Asp Val Ser Ile Thr Thr Ile Pro Gly
420 425 430

Ile Arg Gly His Gln Leu Asp Pro Ser Gln Thr Pro Glu Tyr Ser Pro
435 440 445

Ser Ile Arg Gly Asn Gly Ile Ser Cys Lys Thr Ile Phe Asp Cys Thr
450 455 460

Val Pro Trp Ala Leu Lys Ser His Phe Glu Arg Ala Pro Phe Ala Asp
465 470 475 480

Val Asp Pro Arg Pro Phe Ala Pro Glu Tyr Phe Ala Arg Leu Glu Lys
485 490 495

Asn Gln Gly Ser Ala Lys
500

<210> 9
<211> 5502
<212> DNA
<213> Klebsiella pneumoniae

<220>
<221> gene
<222> (1)..(5502)
<223> DNA sequence of the aroY gene of Klebsiella pneumoniae 342 plus 2 kilobases of surrounding DNA sequences

<400> 9

gcgacgccga ctgggcgatc cgtgaactgc tggcgcgtat gacccagcgt ctgcagggct 60

gtgaaaccat agaggatgtg attaaggtgg cggagctgtt cgcgccgaac atcgccccga 120

cgatccccgg taaactgtat attctggata ccgatccatg gcagatgcgc tgcgtggcgc 180

agtggctgtc gcccgccggg gagacgacgt cctttgctcc cgacgactgc tgggcgatac 240

ggcggggact cagccatccg ccggtgcagg gtgagcccga tatcacctgc tatcatctgc 300

cggaggcgca cgccggccag tcgctctgcg taccgctcat cgcccagggc gaagcgatcg 360

gtctgctgag ctttcagaac gtcaccgcca gtgacgcccc ttcccgggct tacctggagc 420

tgatggccga agcgctgggg ctggcgctcg ccaatcagcg tttacgcagc gccctgctgg 480

aaaaagcgtt gttcgattcg ctgaccggcc tgcgtaaccg ccatcatctt gatgaagcgc 540

tgcactcgca gatggcgctg gcggtccata cccacacccc gctgagctgc ctgatgatcg 600

acatcgatca cttcaaagcc atcaatgacc gctacggcca tgaagccggg gatctggtga 660

ttaagagcgt cgcgaccatt gtgcagcgcg cggtgcgcga tatcggcatg gctttccgct 720

acggcggcga ggagttttta gtgctgctcc ccgggattga cgaagccggg gcgcaccagt 780

gcgccagcga gatctacacc caggtgcaca atatgacgct gcgcgatggc ctgacggaga 840

taggccaggt ggatgtgtcg attggcatcg ccagctaccc gcagcacacc caaagcgaca 900

gcctgctgcg cgcagcggac gccgcgctgt accgggcgaa agagctgggc cgttcaagga 960

ttgtcagctt tggccgcctg aagacccgct aagcgggatt attgctcagc ggcattaagc 1020

agcgagataa ctttccgcac caccgccgaa cggaaatggc ggtggtaaac catgctcagc 1080

tcactctccg ccagccgatc ctgaagatcg atatacacca cgttatcaag gcgtaaggcc 1140

ctcgccgaga ccggcaccag cgccaccccc accccggcgg agaccaggct aatcatcgag 1200

gtgacatcgt taattcgctg caccacctgc ggcgtaaaac ccgcgacgcg acaggcgtca 1260

ataaatacct gctccagtcc ggtgccctgc ggatcgtcaa gcgagatcca gttgtcagtg 1320

cgcaacgagg ccagattgag cgcccccacg cctgccagcg gatgctgttg ataaagcgcc 1380

aggcaaagtt tttcccgcac aaatggcctg accaccagcg cgtccggcgg tgacgccagc 1440

ggcgcgcgga tgatggcgat atccagacgc agatccagca gcgcttcgta gagcatttgc 1500

acatccccct gcaccagcga cagctcaatc cccggccagt cagcgcgcag ctcgcgcagg 1560

agccccggca gtttgctgtc atacatcgca ctggagacat agcccagatg caatcgcccc 1620

tgctcgcctc gtgcggtgcg ctgggcgtcc aggaccgcct gatcggccat ctccagcgcc 1680

agccgcgtct tctgcaagaa ggcctcgccc gcggcggtga gggtcaggcg ccggttagcg 1740

cgggagaaga gcaccacgcc caggcgctgc tcgagttgtt taatctgctg gctgagggcg 1800

ggctgggcga tatgtaaccg ctctgccgcc cgatgcatat gtagttcttc agcaacgacc 1860

acaaaatggc gtaacgctcg caaggacatg gccggactcc gcggagtaaa ttgataataa 1920

aaatgttatc aataaagcat gaatgatgca attgataacc attagcctgc gagcatactg 1980

tgcgcatcga cacgctaagg agaacatcat gaccgcaccg attcaggatc tgcgcgacgc 2040

tatcgcgctg ctgcaacagc atgacaatca gtacctcgaa accgatcatc cggttgaccc 2100

taacgctgag ctggccggcg tctatcgcca catcggcgcg ggcggcaccg tgaagcgccc 2160

cacgcgcatc ggcccggcga tgatgtttaa caatattaag ggctatccgc actcgcgcat 2220

tctggtgggc atgcacgcca gccgccagcg ggccgcgctg ctgctgggct gcgaagcctc 2280

acagctggcg ctggaggtag gcaaagcggt gaaaaaaccg gtcgcgccgg tggtcgttcc 2340

ggccagcagc gccccctgtc aggaacaggt ctttctggcc gacgatccgg attttgattt 2400

gcgcaccctg ctcccggcgc ccaccaacac cccgatcgac gccggtccct tcttctgcct 2460

gggcctggcg ctggccagcg atcccgacga cgcctcgctc accgacgtca ccatccaccg 2520

cttgtgcgtc cagggccggg atgagctgtc gatgtttctc gccgctggcc gccatatcga 2580

agtgtttcgt cagaaagccg aggccgctgg caaaccgctg ccgataacca tcaatatggg 2640

actcgatccg gctatctata tcggcgcctg ctttgaagcg ccgaccacac gtttggctat 2700

aacgaactgg gcgtcgccgg tgcgctgcgt cagcgtccgg tagagctggt acagggcgtc 2760

agcgtcccgg agaaagccat cgctcgcgcc gagatcgtta tcgaagggga actgctgccg 2820

ggggtacgcg tcagagaaga tcagcacaca acagcggcca tgcgatgccg gaatttcctg 2880

gttactgcgg cggcgccaat ccgtcgctgc cggtcattaa agtcaaagcg gtgaccatgc 2940

gaaacaatgc gattctgcag acgctggtag ggccgggcga agagcatacc accctcgccg 3000

gattgccaac ggaagccagt atctggaatg ctgtcgaggc tgctatcccg ggctttttac 3060

aaaatgtcta cgcccacacc gcgggcggcg gtaaattcct cgggatcctg caggtgaaaa 3120

aacgccagcc cgccgacgaa gggcgtcagg ggcaggccgc gttgctggcg ctggcgacct 3180

attccgagct gaaaaatatc attctggtcg atgaagatgt cgatatcttt gacagcgacg 3240

atatcctgtg ggccatgacc acccgcatgc agggggatgt cagcatcacg acgatcccag 3300

gcattcgtgg tcaccagctg gatccttccc agaccccggc ctacagcccg tcgatccgcg 3360

gagagggtat cagttgcaag acgattttcg attgcacggt gccgtgggcg ctaaaatcac 3420

acttcgagcg cgcaccgttt gccgatgtcg atccgcgtcc gtttgcgccg gagtattttg 3480

cccggctgga aaaaaaccac ggtcagtaaa atcaggtgat agccgccgga gcacggcggc 3540

atcttccggg ccagcatcac ctgcagcggg tggctgacgc agggttagtt gatcgcggcg 3600

gagaggtctt ttttcacctg ctcacgctgc tcgggggtca acacctggct cacgtcgaag 3660

tagtatttca cacgataata ccgcacctgc tggtccagct ggccaaaggc ggccagctgc 3720

tgtttgacct tagcgtcatc ccatttcccg gagtgaataa cgtctgccag ggcaccatcc 3780

tgatagccgc tgatttaatc tggcttacat tgttttcgaa tccctgacgc agcgcctgga 3840

ttttggcgac ctgctcttca ctcagcttca ggtgctggac gaccggatcc tgcgagacag 3900

acggtatatc ggcggaggtc gacgcctggc tggctgccgt aaagcaggtg gtcagcgcaa 3960

tggcgagcag ggtgttacgc aagcgagtat tcacagtgaa tgatccttca aaaaagaaaa 4020

tgagaggcga ttatcactgc gctaataaag actatctgta acaaagggtt aatttaaaac 4080

tggataaaaa aaggatggta agaaacagaa atcagatccc gggtcagcag cacagaaaga 4140

tatattcatc cttccagtaa cggccctgtc caatgatatc cccggcggcg ctgattaact 4200

gtttttgctt ttggtttcaa tcccctcaac gatcacatgg ctggtcaggg tatgaataga 4260

ttgcaacagc ccgggaaaag cggggtcgtt ttctttatcc cagaagtaat ctttatccac 4320

tttgacgcaa tcgaagcgga agcgctccag cagcgggaag gacgtcgtcc gcggccaaaa 4380

tcatccagcc agaccgggca aagcgccgcc agcgtgctca gcgccgtcag ctcacgtccg 4440

gcgataaact cgtgaaagtt ctcatttatt tccagagcaa tgtgtttaca ggagcgcagg 4500

aaatcacaga gatagcgatc cgtcagaata aagtggctta ataaatcatc aatattcagc 4560

gatatcggtt tattatcgac ccgggcgaaa tcaaatacag aaagtaactc gatttgccga 4620

ataaatagag caagcttatc gcgttcggta agcgtggaga aagaaaacgt cgacgcagag 4680

gtggtatttt gtgcgggtgc tataatatct ttagtaagca actcccacga gtggtagctg 4740

ccgtcatcgc taatagcggg ctccagaacg aagcgataag aggtattttt cacgttttct 4800

tcaaccattt aaaaaatacc aaaaataaga aagggttaag catgtcatat attttccgcc 4860

aacaaaaata gtttaaagtg atcgataata atcattcgat agttaaaaac tatcaagata 4920

taatttattg atcggtaaat tgaattaata taaattagcc actgccgtaa ctccctctga 4980

aaagtcaatt aaaatattgt ttcaaaccag ccagttacca gagtattctg cgtaaagcct 5040

ggtcgtctca cgctttgtgc tgccaggtaa aaaaagagag gggtaataaa aatgaaaaat 5100

acaagccgcc agttttagtc atatcattat gccgaatatg aataacgctg cgctgaggcg 5160

ccgcttcgcc tggcatgcca tgagtcctca acaaaaaagt gtgactcagt cgacaaaacg 5220

tcatattttc ccgctatcct gcagcgaaga agagtgaagt ggatgacagg cagtgaaaaa 5280

aataaacgtg attccgctgg ggctgatgct attcatgctc atcgccagcg catggctggg 5340

ccctgcgccg cggcacaccg gcagcatgca gtgcgtttgg tttgacgggg caatggtgag 5400

ctgcctgccg aagcaacgac tgggcgaagg ctcgccgcat catttactgg tcagacgata 5460

aaccggtact cgccgggtgg tgttgaacag attatcgctg gc 5502

<210> 10

<211> 4629

<212> DNA

<213> Acinetobacter baylyi

<220>

<221> gene

<222> (1)..(4629)

<223> DNA sequence of the catA gene from Acinetobacter baylyi ADP1, including 410 bases of upstream sequence and two open reading frames downstream

<400> 10

atctgctcga ccatagtaat gatcacatta tgagctaaat ttacttttta aaatttaaat 60

atattatata tatttgaatt ttattgtttt attttaattt ttagcttaga agtttttatt 120

aagatttatt tttaaattag atgtcgaaaa aattagtata ccaaaaaagc atgaaaacat 180

actctcttag gaattggagt cgccatgagt ttcagataca gttgatcagt atggaaggta 240

tagaaacgac tatcgaaata ataagtttg tggtgtgtga agcaaggtaa agctcaaggc 300

tgaggcaaac caagcaaagg ttaattgaac cgatatgcac aacacattca acgatagcgt 360

cgacagataa gtttatcaaa tgatgttttg gcgatttcaa ggagaaagcc atggaagtta 420

aaatattcaa tactcaggat gtgcaagatt ttttacgtgt tgcaagcgga cttgagcaag 480

aaggtggcaa tccgcgtgta aagcagatca tccatcgtgt gctttcagat ttatataaag 540

ccattgaaga tttgaatatc acttcagatg aatactgggc aggtgtggca tatttaaatc 600

agctaggtgc caatcaagaa gctggtttac tctcgccagg cttgggtttt gaccattacc 660

tcgatatgcg tatggatgcc gaagatgccg cactaggtat tgaaaatgcg acaccacgta 720

ccattgaagg cccgctatac gtggcaggtg cgcctgaatc ggtaggttat gcgcgcatgg 780

atgacggaag tgatccaaat ggtcataccc tgattctaca tggcacgatc tttgatgcag 840

atggaaaacc tttacccaat gccaaagttg aaatctggca tgccaatacc aaaggctttt 900

attcacactt cgacccaaca ggcgagcagc aggcgttcaa tatgcgccgt agtattatta 960

ccgatgaaaa cggtcagtat cgcgttcgta ccattttgcc tgcgggttat ggttgcccac 1020

cagaaggtcc aacgcaacag ttgctgaatc agttgggccg tcatggtaac cgccctgcgc 1080

acattcacta ttttgtttct gccgatggac accgcaaact aactacgcaa attaatgtgg 1140

ctggcgatcc gtacacctat gacgactttg cttatgcaac ccgtgaaggc ttggtggttg 1200

atgcagtgga acacaccgat cctgaagcca ttaaggccaa tgatgttgaa ggcccattcg 1260

ctgaaatggt tttcgatcta aaattgacgc gtttggttga tggtgtagat aaccaagttg 1320

ttgatcgtcc acgtctagcg gtgtaataca ccaaaatggt tcaaaattat caggcgagtg 1380

atcatgatca ctggcctgtt tttatttcag ggaagggtgg agacaattac gtggacaatc 1440

aaatcattca ggaaaccgta gataaaattt taagcgtatt gccgaatcag gctgggcaat 1500

tggcacgctt ggttcgtctg atgcagtttg cttgtgaccc caccattacc gtcattggta 1560

aatataatca tggtaaaagc cgactactca atgagctgat cgggacagat atttttttctg 1620

ttgccgataa acgagagacg attcaactgg ccgaacataa acaagatcag gtgcgttggt 1680

tggatgcacc cggactcgat gcagatgttg cggcagtgga tgatcgtcat gcttttgaag 1740

cagtctggac acaggcagat attcgccttt ttgtgcattc agtccgagaa ggcgaactcg 1800

atgcaactga gcatcatctt ttacaacaac ttattgaaga tgcagaccat agccggcgcc 1860

aaaccatact ggtcttgacc cagatagatc agataccgga tcagacaatt ttaacccaga 1920

ttaaaacctc aattgcacag caggtaccca aactcgatat ttgggctgtt tcggccactc 1980

gccaccgtca gggtattgaa aatggaaaaa ccttgctgat cgaaaaaagt ggaatcggcg 2040

cgttacgaca tacacttgag caggcacttg ctcaggttcc atctgcacga acgtatgaaa 2100

agaatagatt gctgtctgac ttgcatcatc aacttaagca gttattactc gatcaaaaac 2160

atgtacttca gcaactacaa cagacacagc agcagcaatt gcatgacttt gatacaggac 2220

tcatcaacat actcgataag attcgagtag atcttgagcc cattgtaaat atagatggtc 2280

aagaccaagc actcaatcca gattcatttg ccacgatgtt taaaaataca gcagccaagc 2340

agcaacgtgc caaagtgcag attgcttact cacgtgcctg tatcgagatc aatagccatc 2400

tcatacgtca cggtgtggtg ggtttacccg cagagcaaca aaccacgata aaaagtattg 2460

atacggtcat tgttgcggtt tttggaattt cagtgaaatt tcgcgatcag ctacgtgcat 2520

tgtttttatac cgataccgaa cgacaacgct tgcaaagaga gtttcgattt tattttgaaa 2580

agtcagcagg ccgaatgatt ttagctgcca agattgagca gacaatgcgg cagcaagggt 2640

gtattcaaaa tgcaatgatg gcgttgcaac agatggagag tgcagcatga ccagcggcgg 2700

acacattcaa ttgtttatcg aacacacccg gcagattgcg actgcccaag gggatataca 2760

gttggcattg caatcgatgc agcaatggcg cgaagcattt gctacagcat taaaacaaaa 2820

taccttttgat ttaacgggct ggtcaccgca gacaaagatc gccaatcaac tcaagcaatt 2880

taaccataag cttacaacgc atgtatcgaa ttgggatacc gaatggcata cttttagtgc 2940

tgctcaatcg gttgcagaag tatttcatga tcgggtgatg ttgcttgtat tcggtaagtt 3000

taatgccgga aagagttcat tgtgtaactt actggccgaa tgctttcgtt ctcacgaaca 3060

aaccgtgcaa tattttcatg ttcaaaatga acagatattt tataccgaat ctcacttacg 3120

cgaaggtgca accgagacga cagcgcaact acagggcgta tgtctgggtg aaaaacttat 3180

tttgctagat acaccaggtt tgcattctgg tactcagaaa aatgcagcgc tcacacaaaa 3240

atttatcgac agtgcagatg gtgtgctgtg gctcagtagc gcaacttcac cgggtcaggt 3300

gcaagagcta gatgcactgg ggcgcgagtt aaagcgtcat aaacctttat ttcctgttat 3360

tacccgaagc gattttgtcg aagaagatga aattgatggt gagctatgta cagtgctttg 3420

caataaaaat tcagaacaac gtgcgttgca agagtctgat gtattgatgc gtgcgaaaga 3480

aaaactgcac atatgcaagt ggatgtgagt ttattaaagc cgcccgtgtc cgtttcaact 3540

caaatggcgc gtgaagcaga tatgaaccca caagccatga acgaggctgg ttttgagcga 3600

ttatttgcag cacttttggc tcttattgag cctgctttgc gctataagca gcgtaaacct 3660

gccgaagtat tgttgcattt tttgcaagaa catatcattg aaggtttaag gttttacctg 3720

caacccgatc tagagcaaat acaacaggac ctcaaacagg ctcaagatga tttacgacag 3780

ctacacaccg atttagccga ggcagtctgg cgtagcgtat tgcctgagct accacaactt 3840

cttgagcaac atgcaagtac acaaaatatt gatgccgtag tgaacagttt gaacgagtgg 3900

ataaacgtcg cattcgaaca acagcttgca attcagcttg atgcttatgg tttaaatttg 3960

gattcgctta gcaagatcga aaaaaccgaa aaaatgcagt atgaacgcat tgcgggaatg 4020

gtggtgcatg atggcttgta cacgactctc acgcagcaga ttcaacaagc tgtcaaagct 4080

tctacgagtg aattgattga tcagtgtcag gctcaacttg agcagtcaat caaacatgtt 4140

caaacactcg atgaaacctt catcgattac agcgcagcac tcgatcaact cagccaagcg 4200

ctacgcattg aataaagagc agtaaatttt tcagacatat tttattcgat gagtggcctg 4260

atatggtgcg ttgcaaacac ctcctgtaca caggcgagaa ttttaggaat gtaattactg 4320

tggtccatat ttcgcaccgc gagtgaaatt gggctatagg catcatcatc taaaattgga 4380

atataaagta gattcttcac cccaatatcc atggcagacg ccggtacgat gcagacgcct 4440

tcacctgctg ccaccaagcc gagtgccagt tgaatttctc gaatttcggt gagtttggat 4500

ggtactaggc ctagttcggt aaagagtgac tgaataaagg tcgcaaaatt gggcttttga 4560

gagactgggt acagcagcat cggttcatca ataatttgag agagatgaac ccctgttgct 4620

gcaaactga 4629

<210> 11
<211> 311
<212> PRT
<213> Acinetobacter baylyi

<220>
<221> PEPTIDE
<222> (1)..(311)
<223> Protein sequence of CatA (catechol 1,2-dioxygenase) from
Acinetobacter baylyi ADP1

<400> 11

Met Glu Val Lys Ile Phe Asn Thr Gln Asp Val Gln Asp Phe Leu Arg
1 5 10 15

Val Ala Ser Gly Leu Glu Gln Glu Gly Gly Asn Pro Arg Val Lys Gln
20 25 30

Ile Ile His Arg Val Leu Ser Asp Leu Tyr Lys Ala Ile Glu Asp Leu
35 40 45

Asn Ile Thr Ser Asp Glu Tyr Trp Ala Gly Val Ala Tyr Leu Asn Gln
50 55 60

Leu Gly Ala Asn Gln Glu Ala Gly Leu Leu Ser Pro Gly Leu Gly Phe
65 70 75 80

Asp His Tyr Leu Asp Met Arg Met Asp Ala Glu Asp Ala Ala Leu Gly
85 90 95

Ile Glu Asn Ala Thr Pro Arg Thr Ile Glu Gly Pro Leu Tyr Val Ala
100 105 110

Gly Ala Pro Glu Ser Val Gly Tyr Ala Arg Met Asp Asp Gly Ser Asp
115 120 125

Pro Asn Gly His Thr Leu Ile Leu His Gly Thr Ile Phe Asp Ala Asp

130 135 140

Gly Lys Pro Leu Pro Asn Ala Lys Val Glu Ile Trp His Ala Asn Thr
145 150 155 160

Lys Gly Phe Tyr Ser His Phe Asp Pro Thr Gly Glu Gln Gln Ala Phe
165 170 175

Asn Met Arg Arg Ser Ile Ile Thr Asp Glu Asn Gly Gln Tyr Arg Val
180 185 190

Arg Thr Ile Leu Pro Ala Gly Tyr Gly Cys Pro Pro Glu Gly Pro Thr
195 200 205

Gln Gln Leu Leu Asn Gln Leu Gly Arg His Gly Asn Arg Pro Ala His
210 215 220

Ile His Tyr Phe Val Ser Ala Asp Gly His Arg Lys Leu Thr Thr Gln
225 230 235 240

Ile Asn Val Ala Gly Asp Pro Tyr Thr Tyr Asp Asp Phe Ala Tyr Ala
245 250 255

Thr Arg Glu Gly Leu Val Val Asp Ala Val Glu His Thr Asp Pro Glu
260 265 270

Ala Ile Lys Ala Asn Asp Val Glu Gly Pro Phe Ala Glu Met Val Phe
275 280 285

Asp Leu Lys Leu Thr Arg Leu Val Asp Gly Val Asp Asn Gln Val Val
290 295 300

Asp Arg Pro Arg Leu Ala Val
305 310

<210> 12
<211> 1461
<212> DNA
<213> Acinetobacter sp. ADP1

<220>
<221> gene
<222> (1)..(1461)
<223> DNA sequence of the quiC (3-dehydroshikimate dehydratase)gene
from Acinetobacter sp. ADP1

<400> 12
atgaaattaa cttctttacg cgtatcttta ttggcgctgg gcttggtaac atcaggtttt 60

gctgcggcag aaacttatac tgtagatcgt tatcaggatg atagtgaaaa aggctctttg 120

cgttgggcaa ttgaacaatc taatgcaaat agcgcacaag agaatcagat tctgattcag 180

gctgttggta aggcacctta tgtgatcaag gtggataaac cgttaccacc gattaaatca 240

tctgtaaaaa ttattggtac agaatgggat aaaacgggcg aatttattgc gattgatggt 300

tcaaactata tcaagggcga aggcgaaaaa gcatgtccag gtgcaaatcc aggacaatat 360

ggtaccaatg ttcgtaccat gactttacca ggtttggttc tacaagatgt caatggtgtg 420

accctgaaag gtcttgatgt tcatcgcttc tgtattggtg tactggtaaa tcgttcaagc 480

aataatttga ttcagcataa ccgtatttca aataattacg gtggcgctgg tgtcatgatc 540

acgggtgatg atggtaaagg taacccaacg tctaccacca ccaataacaa caaagtattg 600

gataatgtgt ttattgacaa tggcgatggt cttgaactga cgcgtggagc agcattcaac 660

ctgattgcta acaatctgtt tacatcgacc aaagccaatc cagagccgtc tcaaggcatt 720

gaaattcttt gggggaatga caatgcagtg gtgggtaaca aatttgaaaa ctattcagat 780

ggtctacaaa tcaactgggg taaacgtaat tacatcgctt ataacgaatt gaccaataac 840

tctttgggtt tcaatcttac aggtgatgga aacatcttcg atagtaacaa agtgcatggc 900

aatcgtattg gtatcgcaat tcgttctgaa aaagatgcaa atgcacgtat cacacttacc 960

aaaaatcaga tttgggataa tggtaaagat atcaaacgct gtgaggctgg tggttcatgt 1020

gttccaaacc aacgtttagg tgcaattgta tttggtgttc ctgcgcttga gcatgaaggt 1080

tttgtaggct ctcgtggtgg cggtgtagtc attgaacctg caaaattaca aaaaacatgt 1140

acacagccaa atcaacaaaa ctgtaatgcc attccgaacc aaggtattca ggcacctaaa 1200

ctgactgtca gtaaaaaaca acttacagtt gaagttaaag gaacaccaaa ccagcgttac 1260

aacgtagaat tttttggaaa tcgtaatgca tcttcttccg aagctgagca atatttaggt 1320

tcaattgttg tagtgacaga tcatcaaggt cttgcaaaag caaactgggc accaaaagtc 1380

agcatgccat ctgttactgc gaatgtaact gatcacttgg gcgccacttc agagttaagt 1440

tctgcagtga aaatgagata a 1461

<210> 13
<211> 1461
<212> DNA
<213> Acinetobacter sp. arc5

<220>
<221> gene
<222> (1)..(1461)
<223> Codon-optimized DNA sequence of the quiC (3-dehydroshikimate dehydratase)gene from Acinetobacter sp. ADP1

<400> 13

atgaaactga ccagcctgcg tgttagcctg ctggcactgg gtctggttac cagcggtttt 60

gcagcagcag aaacctatac cgttgatcgt tatcaggatg atagcgaaaa aggtagcctg 120

cgttgggcaa ttgaacagag caatgcaaat agcgcacaag aaaaccagat tctgattcag 180

gcagttggta aagcaccgta tgttatcaaa gttgataaac cgctgcctcc gattaaaagc 240

agcgttaaaa tcattggcac cgagtgggat aaaaccggtg aatttattgc aattgatggc 300

agcaactata tcaaaggcga aggtgaaaaa gcatgtccgg gtgcaaatcc gggtcagtat 360

ggcaccaatg ttcgtaccat gaccctgcct ggtctggttc tgcaagatgt taatggtgtt 420

accctgaaag gtctggatgt tcatcgtttt tgtattggtg ttctggttaa tcgcagcagc 480

aataacctga ttcagcataa tcgtatcagc aacaattatg gtggtgccgg tgttatgatt 540

accggtgatg atggtaaagg taatccgacc agcaccacca ccaataataa caaagttctg 600

gataacgtgt tcatcgataa tggtgatggt ctggaactga cccgtggtgc agcatttaat 660

ctgattgcaa ataacctgtt taccagcaca aaagccaatc cggaaccgag ccagggtatt 720

gaaattctgt ggggtaatga taatgccgtg gtgggtaaca aattcgaaaa ctattcagat 780

ggcctgcaaa tcaattgggg taaacgtaac tatatcgcct ataacgaact gaccaataac 840

agcctgggtt tcaatctgac aggtgatggt aacattttcg acagcaataa agtgcatggt 900

aaccgtattg gtattgccat tcgtagtgaa aaagatgcca atgcacgtat taccctgacc 960

aaaaatcaga tttgggataa cggcaaagat atcaaacgtt gtgaagccgg tggtagctgt 1020

gttccgaatc agcgtctggg tgcaattgtt tttggtgttc cggcactgga acatgaaggt 1080

tttgttggta gccgtggcgg tggtgttgtt attgaaccgg caaaactgca aaaaacctgc 1140

acccagccga accagcagaa ttgtaatgca attcctaatc agggtattca ggcaccgaaa 1200

ctgacagtta gcaaaaaaca gctgaccgtt gaagttaaag gcacccctaa tcagcgttat 1260

aatgtggaat tttttggcaa tcgtaatgcc agcagcagcg aagcagaaca gtatctgggt 1320

agcattgttg ttgttaccga tcatcagggt ctggcaaaag caaattgggc tccgaaagtt 1380

agcatgccga gcgttaccgc aaatgtgaca gatcatctgg gtgcgaccag cgaactgagc 1440

agcgcagtta aaatgcgtta a 1461

<210> 14
<211> 486
<212> PRT
<213> Acinetobacter sp. arc5

<220>
<221> PEPTIDE
<222> (1)..(486)
<223> Protein sequence of QuiC (3-dehydroshikimate dehydrogenase from Acinetobacter sp. ADP1

<400> 14

Met Lys Leu Thr Ser Leu Arg Val Ser Leu Leu Ala Leu Gly Leu Val
1 5 10 15

Thr Ser Gly Phe Ala Ala Ala Glu Thr Tyr Thr Val Asp Arg Tyr Gln
20 25 30

Asp Asp Ser Glu Lys Gly Ser Leu Arg Trp Ala Ile Glu Gln Ser Asn
35 40 45

Ala Asn Ser Ala Gln Glu Asn Gln Ile Leu Ile Gln Ala Val Gly Lys
50 55 60

Ala Pro Tyr Val Ile Lys Val Asp Lys Pro Leu Pro Pro Ile Lys Ser
65 70 75 80

Ser Val Lys Ile Ile Gly Thr Glu Trp Asp Lys Thr Gly Glu Phe Ile
85 90 95

Ala Ile Asp Gly Ser Asn Tyr Ile Lys Gly Glu Gly Glu Lys Ala Cys
100 105 110

Pro Gly Ala Asn Pro Gly Gln Tyr Gly Thr Asn Val Arg Thr Met Thr
115 120 125

Leu Pro Gly Leu Val Leu Gln Asp Val Asn Gly Val Thr Leu Lys Gly
130 135 140

Leu Asp Val His Arg Phe Cys Ile Gly Val Leu Val Asn Arg Ser Ser
145 150 155 160

Asn Asn Leu Ile Gln His Asn Arg Ile Ser Asn Asn Tyr Gly Gly Ala
165 170 175

Gly Val Met Ile Thr Gly Asp Asp Gly Lys Gly Asn Pro Thr Ser Thr
180 185 190

Thr Thr Asn Asn Asn Lys Val Leu Asp Asn Val Phe Ile Asp Asn Gly
195 200 205

Asp Gly Leu Glu Leu Thr Arg Gly Ala Ala Phe Asn Leu Ile Ala Asn
210 215 220

Asn Leu Phe Thr Ser Thr Lys Ala Asn Pro Glu Pro Ser Gln Gly Ile
225 230 235 240

Glu Ile Leu Trp Gly Asn Asp Asn Ala Val Val Gly Asn Lys Phe Glu
245 250 255

Asn Tyr Ser Asp Gly Leu Gln Ile Asn Trp Gly Lys Arg Asn Tyr Ile
260 265 270

Ala Tyr Asn Glu Leu Thr Asn Asn Ser Leu Gly Phe Asn Leu Thr Gly
275 280 285

Asp Gly Asn Ile Phe Asp Ser Asn Lys Val His Gly Asn Arg Ile Gly
290 295 300

Ile Ala Ile Arg Ser Glu Lys Asp Ala Asn Ala Arg Ile Thr Leu Thr
305 310 315 320

Lys Asn Gln Ile Trp Asp Asn Gly Lys Asp Ile Lys Arg Cys Glu Ala
325 330 335

Gly Gly Ser Cys Val Pro Asn Gln Arg Leu Gly Ala Ile Val Phe Gly
340 345 350

Val Pro Ala Leu Glu His Glu Gly Phe Val Gly Ser Arg Gly Gly Gly
355 360 365

Val Val Ile Glu Pro Ala Lys Leu Gln Lys Thr Cys Thr Gln Pro Asn
370 375 380

Gln Gln Asn Cys Asn Ala Ile Pro Asn Gln Gly Ile Gln Ala Pro Lys
385 390 395 400

Leu Thr Val Ser Lys Lys Gln Leu Thr Val Glu Val Lys Gly Thr Pro
405 410 415

Asn Gln Arg Tyr Asn Val Glu Phe Phe Gly Asn Arg Asn Ala Ser Ser
420 425 430

Ser Glu Ala Glu Gln Tyr Leu Gly Ser Ile Val Val Val Thr Asp His
435 440 445

Gln Gly Leu Ala Lys Ala Asn Trp Ala Pro Lys Val Ser Met Pro Ser
450 455 460

Val Thr Ala Asn Val Thr Asp His Leu Gly Ala Thr Ser Glu Leu Ser
465 470 475 480

Ser Ala Val Lys Met Arg

485

<210> 15

<211> 9462

<212> DNA

<213> Escherichia coli

<220>

<221> misc_feature

<222> (1)..(9462)

<223> DNA sequence of the plasmid pAC21

<400> 15

gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt taccccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc tttttatctt tttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttta aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc tttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagc 4380

ggataacaat ttcacacagg aaacagctat gaccatgatt acgccaagct tgcatgcctg 4440

caggtcgact ctagaggatc ccccccgccg ccgacagagt aataggtttt acttaatagc 4500

tcttcctgtc ccttccaggc agtgatccgc attccgttct catggcgagg caacatttcg 4560

ggatggaaga taatgttctt tgctacagga aaatcaacaa tatgcgcacc agatgccact 4620

ggcagccgcc cgctgcgcgt tactaactct ataaatgcag ggatctcatc aatgacaaca 4680

tcctgcggac tgtttcctgc cagtcccatg atgatggcga catccgtggc atggcctttg 4740

cccgtcagtg acaacgaccc gtacagatcg accacaatat ggctcgtcgc ggttaataag 4800

ccgctacttt ccagccgatc aataaaactt tttccggcat tcattggccc cacggtatgc 4860

gaactggagg gaccaatccc aattttgaaa atatcgaatg cactaatcat gtgacggaag 4920

atcacttcgc agaataaata aatcctggtg tccctgttga taccgggaag ccctgggcca 4980

acttttggcg aaaatgagac gttgatcggc acgtaagagg ttccaacttt caccataatg 5040

aaataagatc actaccgggc gtatttttg agttatcgag attttcagga gctaaggaag 5100

ctaaaatgga gaaaaaaatc actggatata ccaccgttga tatatcccaa tggcatcgta 5160

aagaacattt tgaggcattt cagtcagttg ctcaatgtac ctataaccag accgttcagc 5220

tggatattac ggccttttta aagaccgtaa agaaaaataa gcacaagttt tatccggcct 5280

ttattcacat tcttgcccgc ctgatgaatg ctcatccgga attccgtatg gcaatgaaag 5340

acggtgagct ggtgatatgg gatagtgttc acccttgtta caccgttttc catgagcaaa 5400

ctgaaacgtt ttcatcgctc tggagtgaat accacgacga tttccggcag tttctacaca 5460

tatattcgca agatgtggcg tgttacggtg aaaacctggc ctatttccct aaagggttta 5520

ttgagaatat gtttttcgtc tcagccaatc cctgggtgag tttcaccagt tttgatttaa 5580

acgtggccaa tatggacaac ttcttcgccc ccgttttcac catgggcaaa tattatacgc 5640

aaggcgacaa ggtgctgatg ccgctggcga ttcaggttca tcatgccgtt tgtgatggct 5700

tccatgtcgg cagaatgctt aatgaattac aacagtactg cgatgagtgg cagggcgggg 5760

cgtaattttt ttaaggcagt tattggtgcc cttaaacgcc tggtgctacg cctgaataag 5820

tgataataag cggatgaatg gcagaaattc gaaagcaaat tcgacccggt cgtcggttca 5880

gggcagggtc gttaaatagc cgcttatgtc tattgctggt ttantcggta cccggggatc 5940

gcggccgcgg accggatccc atcacatata cctgccgttc actattattt agtgaaatga 6000

gatattatga tattttctga attgtgatta aaaaggcaac tttatgccca tgcaacagaa 6060

actataaaaa atacagagaa tgaaaagaaa cagatagatt ttttagttct ttaggcccgt 6120

agtctgcaaa tccttttatg attttctatc aaacaaaaga ggaaaataga ccagttgcaa 6180

tccaaacgag agtctaatag aatgaggtcg aaaagtaaat cgcgcgggtt tgttactgat 6240

aaagcaggca agacctaaaa tgtgtaaagg gcaaagtgta tactttggcg tcacccctta 6300

catattttag gtctttttt attgtgcgta actaacttgc catcttcaaa caggagggct 6360

ggaagaagca gaccgctaac acagtacata aaaaaggaga catgaacgat gaacatcaaa 6420

aagtttgcaa aacaagcaac agtattaacc tttactaccg cactgctggc aggaggcgca 6480

actcaagcgt ttgcgaaaga aacgaaccaa aagccatata aggaaacata cggcatttcc 6540

catattacac gccatgatat gctgcaaatc cctgaacagc aaaaaaatga aaaatatcaa 6600

gttcctgaat tcgattcgtc cacaattaaa aatatctctt ctgcaaaagg cctggacgtt 6660

tgggacagct ggccattaca aaacgctgac ggcactgtcg caaactatca cggctaccac 6720

atcgtctttg cattagccgg agatcctaaa aatgcggatg acacatcgat ttacatgttc 6780

tatcaaaaag tcggcgaaac ttctattgac agctggaaaa acgctggccg cgtctttaaa 6840

gacagcgaca aattcgatgc aaatgattct atcctaaaag accaaacaca agaatggtca 6900

ggttcagcca catttacatc tgacggaaaa atccgtttat tctacactga tttctccggt 6960

aaacattacg gcaaacaaac actgacaact gcacaagtta acgtatcagc atcagacagc 7020

tctttgaaca tcaacggtgt agaggattat aaatcaatct ttgacggtga cggaaaaacg 7080

tatcaaaatg tacagcagtt catcgatgaa ggcaactaca gctcaggcga caaccatacg 7140

ctgagagatc ctcactacgt agaagataaa ggccacaaat acttagtatt tgaagcaaac 7200

actggaactg aagatggcta ccaaggcgaa gaatctttat ttaacaaagc atactatggc 7260

aaaagcacat cattcttccg tcaagaaagt caaaaacttc tgcaaagcga taaaaaacgc 7320

acggctgagt tagcaaacgg cgctctcggt atgattgagc taaacgatga ttacacactg 7380

aaaaaagtga tgaaaccgct gattgcatct aacacagtaa cagatgaaat tgaacgcgcg 7440

aacgtcttta aaatgaacgg caaatggtac ctgttcactg actcccgcgg atcaaaaatg 7500

acgattgacg gcattacgtc taacgatatt tacatgcttg gttatgtttc taattcttta 7560

actggcccat acaagccgct gaacaaaact ggccttgtgt taaaaatgga tcttgatcct 7620

aacgatgtaa cctttactta ctcacacttc gctgtacctc aagcgaaagg aaacaatgtc 7680

gtgattacaa gctatatgac aaacagagga ttctacgcag acaaacaatc aacgtttgcg 7740

ccgagcttcc tgctgaacat caaaggcaag aaaacatctg ttgtcaaaga cagcatcctt 7800

gaacaaggac aattaacagt taacaaataa aaacgcaaaa gaaaatgcca atatcctatt 7860

ggcatttttct tttatttctt ccatttaaat ggatgcatgc gctagcggag tgtatactgg 7920

cttactatgt tggcactgat gagggtgtca gtgaagtgct tcagcctcgt gagcgggacg 7980

gtcgtaaggt cgttccgctc cacttcactg aacggcaatc cgagggtgtg gatccaatta 8040

aggccacgct gtcatttaaa ttccgttttt ccagttcaaa tgcaattgcc ttcaatgcac 8100

cttcgtagct gtggtgagcc agcggtgctg gctctccccc atttacggat aagaatgcat 8160

tttccgagtt aataccgtcg gcaatacctg acattaatac ttcacagtcg ctggcatcga 8220

gtacggaaaa cttaatcgaa gacgaaccac agttaataac caaaacaacc ggaaattcat 8280

tcatctcttt tctcatcctg agttacggat taaaacagtt tgtatacgat gttcaggatg 8340

gtcagcagac caatcacggt aacaaacacg ttatccagac gaccacggta tttcgccaga 8400

gacggcgctt tacggatggc atacatcggc aacaggcaca gcagggatgc gataatcggt 8460

gcgcccatgg cttcaatcag gtcgaggatg ttcgggttgg cgtaggcaac aacccaggtg 8520

gagcccatga tgaagatcat gctgagagta ttcagtttac ccagcgacac tttggttttg 8580

tcacctttat aaccgaactt cagaatcaga ccattcaagc cttccagcgt ccccagatag 8640

tgaccgaaga aagatttgaa gatagccacg agtgcgatga tggaagccgc atattccagt 8700

gtaatcgcga acgttgtttt ggtaccggtc atggacgcaa agtggttagc cagataagaa 8760

agcactggaa tattctgcgc tttggcttcc gccatgttgg ccggagacag agtaaacagg 8820

cagctaaagg caaagaacat caccactgca accatcagca tgctggcacg agaaatgatt 8880

tgggaacatt tacgttcggt gaagtcgcga ccgaagtctt tctcatactc ttcacgttta 8940

gaaaccacga aggaagagac gattggcgag aagttaaagg agaaaaccat gatggaaatc 9000

cccagccaga cagtgatcag gataccgtca tgaccggtta acgacagcga accgaggtca 9060

acctggtcga taactgcaga gttccagtaa gggatcagcg acaaagaaat cagcaccagg 9120

ctggcgataa acggccatac caggtagctc agggtaccga gctcgaattc actggccgtc 9180

gttttacaac gtcgtgactg ggaaaaccct ggcgttaccc aacttaatcg ccttgcagca 9240

catccccctt tcgccagctg gcgtaatagc gaagaggccc gcaccgatcg cccttcccaa 9300

cagttgcgca gcctgaatgg cgaatggcgc ctgatgcggt attttctcct tacgcatctg 9360

tgcggtattt cacaccgcat atggtgcact ctcagtacaa tctgctctga tgccgcatag 9420

ttaagccagc cccgacaccc gccaacaccc gctgacgaat tc 9462

<210> 16
<211> 9430
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(9430)

<223> DNA sequence of the plasmid pAC19

<400> 16

gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt taccccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc ttttttatctt ttttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttta aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc ttttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagc 4380

ggataacaat ttcacacagg aaacagctat gaccatgatt acgccaagct tgcatgcctg 4440

caggtcgact ctagaggatc ccccccgccg ccgacagagt aataggtttt acttaatagc 4500

tcttcctgtc ccttccaggc agtgatccgc attccgttct catggcgagg caacatttcg 4560

ggatggaaga taatgttctt tgctacagga aaatcaacaa tatgcgcacc agatgccact 4620

ggcagccgcc cgctgcgcgt tactaactct ataaatgcag ggatctcatc aatgacaaca 4680

tcctgcggac tgtttcctgc cagtcccatg atgatggcga catccgtggc atggcctttg 4740

cccgtcagtg acaacgaccc gtacagatcg accacaatat ggctcgtcgc ggttaataag 4800

ccgctacttt ccagccgatc aataaaactt tttccggcat tcattggccc cacggtatgc 4860

gaactggagg gaccaatccc aattttgaaa atatcgaatg cactaatcat atccacaccc 4920

tcggattgcc gttcagtgaa gtggagcgga acgaccttac gaccgtcccg ctcacgaggc 4980

tttacgcact acgtactgcg atggcttcaa tttccagcgg gagggcggat ccactaatac 5040

aaaatatatc aaaagttaat aataatatta ttcttactta agacttttt gtcttcattt 5100

tttagtaaaa aatataaaaa aggccacctc ccgattttat cggaaggcag cctcttaaat 5160

tcagttcata atattaaaaa atattattca acttcagaat atttgttggc ataggcagct 5220

gccgcaccca acagtccagg ctgcggataa gtaatcaact taaccggaat cttggacatg 5280

acgcgttcaa agcgtccttt tgaaacaaag cgctgacgga aaccagattc tggcaaatgg 5340

gaagcgatac gaagaccgac accaccgcca ataacaacac tggttgcacc ctgtgccaaa 5400

gcaagatcac cagcgatagc gccaaggctc aagcagaagc gatccaaagc ggcttcagca 5460

aggttgtctt taccttccaa agccatctgc cataatttaa tatcatccag caagctgaac 5520

ggaacgcctt caatggcagc cagtgcttcg tagatattac caagacccgg gccagaaata 5580

atgcgttcga tagaaacgcg gcggaaacgt tcacgtaaac gtgccagaat tttgtcttca 5640

agtctgtcaa gcggagcaaa gtcgatatga ccgccttcag tttcgatgac gaaataacgg 5700

ccttcagtcc gcaacagatg ggcaacaccc aagcccgttc ccggaccaag aatagtgata 5760

acaccatcgc taggaagcgc ttcatcagga ccacaaatat gatccagata agaagaatcc 5820

atatgcgcaa ccgcgtgggc aaccgcgccg aagtcattga tcagaacatg cgtatcgatg 5880

tccagctttt cattcagagt agctggtctt aatacccaag ggttattggt aagttttaaa 5940

acttcaccat gaaccgggcc agcccatgca atagctgcgg cacgtggcag aggacgaccc 6000

agtttttcac cgaaacgttc ccaagctaac tgcaagctag catgttctgc cgttttaaaa 6060

gttgtttctt ctccaagaga aagaacccga ccattgctta cttccgcaat agagaaacgc 6120

gcatgcgttc caccgatgtc aatcgcaaca atttccataa taattccttt ctgaaatcag 6180

aaggctaccc aacaggtaaa ataagtccgc ccgctttata ccatcgttgt aaacaaaaag 6240

tataattggt taagacttat ctaaaaaaga caaaaggatt cagccaaagc aagtttaact 6300

acttctggga gcgccacatc tcctcgattt catccaggct ccgacctttg gtttccggca 6360

cgaagcgagc aacaatcaag ccacctaaga tacttaatgc tgcgaaaacg agataggaga 6420

aaccgtggtt gaaagtctga ttcaatgctg gagaaccatc ggcaacctta aacaggaagt 6480

taaccaagat attagctaac cattgtccgg taacagcgat aggcatagct gcgcccttga 6540

tggaactcgg gaacatttct gacagaacaa cccagcagac agggccccat gacataccaa 6600

agactgcaat ataaagaagc acagaagcca aaggcaaaac accaccgact ttgaaccaga 6660

aacagcagcc taaaacagcc atcattgcag ccataccgag agcaccccaa ataagcagag 6720

gtttacggcc gaagcggtca acaacacggg aagcaatcat ggtgaagatg aagttcacaa 6780

caccgataga gatggtctgc aataatgccg tatcagctcc aaaacctaaa ttctggaaca 6840

tctgcggtgc ataatacagc acggcgttaa taccgactaa ctgctggaag gcagcaacgg 6900

atacaccggc aaaaacaacg gtgataccaa aagcaaacaa acctgcgctg cttttgtcca 6960

tggctttatc aaagccagct ttaatctttt gaatcgtcag attaggatcg gcttgcggtt 7020

ccagacgagc aaggattttg ctagcctcgg aatgacgtcc cttcatcacc aaccaatgcg 7080

gcgtatccgg tgcggttaac agcagcaata agaaggcaat accgatcagg ccttctgaag 7140

ccggagacca gcaccaacca ctggcattaa cccaatcgat agaaccgaaa tgagccagta 7200

accaggtaaa gatataaccg gttaaagcac ccgtcacaat ggccatctgc tgaccagaaa 7260

ccatctgacc acgtttgtct ggcggagcaa tttcagcaat ataggttggg gtcaaggttg 7320

aaacgacacc gatacctaaa ccggcaagaa accggaaaaa gcaaaaaatt tgtaaagccg 7380

aaccaccggt tccaaataat ttttcggtta acgcagcacc aaaaccggcg gcgacgaaac 7440

aaatggaact catcaacaat ccgccgcgac gaccgaagcg aataccaatc cagccagaca 7500

gcaaagaacc ggtaacacaa ccgaccaaaa cagcaacaac gaccatccca gaaagggaag 7560

ccgcagccgt agcagacagg tgacgagggg caataaaatg gatatcaacc ggtgtaccga 7620

ttgcagcgat aaccgctgaa tcgtaaccga aaagcaagcc gcctatagca gcgattaggg 7680

ctagtcgcgt gactagaccc tgactacttt cagaactcat ggcgattcct ctccctctag 7740

agcgtcctgc tgttgttaag attattatac cacaccttgt agataaagtc aacaactttt 7800

tgcaaaattt ttcaggaatt ttagcagagg ttgttctgga tgtagaacaa aacatctttc 7860

cgctcttgtg ctgttaggat atctttcttg gaagctaggt aggcctcgag ttatggcagt 7920

tggttaaaag gaaacaaaaa gaccgttttc acacaaaacg gtctttttcg atttcttttt 7980

acagtcacag ccacttttgc accaattaag gccacgctgt catttaaact ccgtttttcc 8040

agttcaaatg caattgcctt caatgcacct tcgtagctgt ggtgagccag cggtgctggc 8100

tctccccccat ttacggataa gaatgcattt tccgagttaa taccgtcggc aatacctgac 8160

attaatactt cacagtcgct ggcatcgagt acggaaaact taatcgaaga cgaaccacag 8220

ttaataacca aaacaaccgg aaattcattc atctcttttc tcatcctgag ttacggatta 8280

aaacagtttg tatacgatgt tcaggatggt cagcagacca atcacggtaa caaacacgtt 8340

atccagacga ccacggtatt tcgccagaga cggcgcttta cggatggcat acatcggcaa 8400

caggcacagc agggatgcga taatcggtgc gcccatggct tcaatcaggt cgaggatgtt 8460

cgggttggcg taggcaacaa cccaggtgga gcccatgatg aagatcatgc tgagagtatt 8520

cagtttaccc agcgacactt tggttttgtc acctttataa ccgaacttca gaatcagacc 8580

attcaagcct tccagcgtcc ccagatagtg accgaagaaa gatttgaaga tagccacgag 8640

tgcgatgatg gaagccgcat attccagtgt aatcgcgaac gttgttttgg taccggtcat 8700

ggacgcaaag tggttagcca gataagaaag cactggaata ttctgcgctt tggcttccgc 8760

catgttggcc ggagacagag taaacaggca gctaaaggca aagaacatca ccactgcaac 8820

catcagcatg ctggcacgag aaatgatttg ggaacattta cgttcggtga agtcgcgacc 8880

gaagtctttc tcatactctt cacgtttaga aaccacgaag gaagagacga ttggcgagaa 8940

gttaaaggag aaaaccatga tggaaatccc cagccagaca gtgatcagga taccgtcatg 9000

accggttaac gacagcgaac cgaggtcaac ctggtcgata actgcagagt tccagtaagg 9060

gatcagcgac aaagaaatca gcaccaggct ggcgataaac ggccatacca ggtagctcag 9120

ggtaccgagc tcgaattcac tggccgtcgt tttacaacgt cgtgactggg aaaaccctgg 9180

cgttacccaa cttaatcgcc ttgcagcaca tccccctttc gccagctggc gtaatagcga 9240

agaggcccgc accgatcgcc cttcccaaca gttgcgcagc ctgaatggcg aatggcgcct 9300

gatgcggtat tttctcctta cgcatctgtg cggtatttca caccgcatat ggtgcactct 9360

cagtacaatc tgctctgatg ccgcatagtt aagccagccc cgacacccgc caacacccgc 9420

tgacgaattc 9430

<210> 17
<211> 5768
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(5768)
<223> DNA sequence of the plasmid pMH17F

<400> 17
gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt tacccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc tttttatctt tttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttttа aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc tttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagt 4380

tacctagaga gggtgagaat tgccgaacat gcgcataagt ttcccggaca gatttcaggt 4440

ggtcagcagc aacgcgttgc cattgcgcgt tcgctgtgta tgaagccgaa aattatgttg 4500

tttgatgagc caacgtcggc gctcgatcct gagatggtga aagaggtgct ggatacgatg 4560

attgggctgg cgcagtcggg tatgacaatg ttgtgtgtaa cacatgagat ggggtttgca 4620

cgaaccgtcg ctgaccgggt aatttttatg gatcgtgggg aaatagtgga gcaagctgca 4680

cctgatgaat tttttgcgca tcctaaatca gagcgtacga gggcattttt atcgcaggta 4740

atccattaat tgaatgttag ttcgaaaagc aaaaaggcca tcctttcgga tggcctttcg 4800

cttgatttga tgtctggcag tttatggcgg gcgtcctgcc cgccaccctc cgggccgttg 4860

cttcgcaacg ttcaaatccg ctcccggcgg atttgtccta ctcgggagag tgttcaccga 4920

caaacaacag ataaaacaaa aggcccagtc ttccgactga gccttttgtt ttatttgatg 4980

tctggcagtt ccctactctc gcatggggag accccacact accatcggcg ctacggcggt 5040

ttcacttctg agttcggcat ggggtcaggt gggaccaccg cgctactgcc gccagacaaa 5100

ttcttttcta atctgccgaa ctttaaccta aaaagtggtg ctgataccca gagtcgaact 5160

ggggacctca cccttaccaa gggtgcgctc taccaactga gccatatcag cacgctaaat 5220

ttgatgcctg gcagttccct actctcgcat ggggagaccc cacactacca tcggcgctac 5280

ggcgtttcac ttctgagttc ggcatggggt caggtgggac caccgcgcta cggccgccag 5340

gcaaattctg ttttatcaga ccgcttctgc gttctgattt aatctgtatc aggctgaaaa 5400

tcttctctca tccggataac aatttcacac aggaaacagc tatgaccatg attacgccaa 5460

gctcgagctc gaattcactg gccgtcgttt tacaacgtcg tgactgggaa aaccctggcg 5520

ttacccaact taatcgcctt gcagcacatc ccccttcgc cagctggcgt aatagcgaag 5580

aggcccgcac cgatcgccct tcccaacagt tgcgcagcct gaatggcgaa tggcgcctga 5640

tgcggtattt tctccttacg catctgtgcg gtatttcaca ccgcatatgg tgcactctca 5700

gtacaatctg ctctgatgcc gcatagttaa gccagccccg acacccgcca acacccgctg 5760

acgaattc 5768

<210> 18

<211> 1053

<212> DNA

<213> Escherichia coli

<220>

<221> gene

<222> (1)..(1053)

<223> DNA sequence of the coding region of the wild type aroG gene

<400> 18

atgaattatc agaacgacga tttacgcatc aaagaaatca aagagttact tcctcctgtc 60

gcattgctgg aaaaattccc cgctactgaa aatgccgcga atacggttgc ccatgcccga 120

aaagcgatcc ataagatcct gaaaggtaat gatgatcgcc tgttggttgt gattggccca 180

tgctcaattc atgatcctgt cgcggcaaaa gagtatgcca ctcgcttgct ggcgctgcgt 240

gaagagctga aagatgagct ggaaatcgta atgcgcgtct attttgaaaa gccgcgtacc 300

acggtgggct ggaaagggct gattaacgat ccgcatatgg ataatagctt ccagatcaac 360

gacggtctgc gtatagcccg taaattgctg cttgatatta acgacagcgg tctgccagcg 420

gcaggtgagt ttctcgatat gatcacccca caatatctcg ctgacctgat gagctggggc 480

gcaattggcg cacgtaccac cgaatcgcag gtgcaccgcg aactggcatc agggctttct 540

tgtccggtcg gcttcaaaaa tggcaccgac ggtacgatta aagtggctat cgatgccatt 600

aatgccgccg gtgcgccgca ctgcttcctg tccgtaacga aatgggggca ttcggcgatt 660

gtgaatacca gcggtaacgg cgattgccat atcattctgc gcggcggtaa agagcctaac 720

tacagcgcga agcacgttgc tgaagtgaaa gaagggctga acaaagcagg cctgccagca 780

caggtgatga tcgatttcag ccatgctaac tcgtccaaac aattcaaaaa gcagatggat 840

gtttgtgctg acgtttgcca gcagattgcc ggtggcgaaa aggccattat tggcgtgatg 900

gtggaaagcc atctggtgga aggcaatcag agcctcgaga gcggggagcc gctggcctac 960

ggtaagagca tcaccgatgc ctgcatcggc tgggaagata ccgatgctct gttacgtcaa 1020

ctggcgaatg cagtaaaagc gcgtcgcggg taa 1053

<210> 19
<211> 8820
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(8820)
<223> DNA sequence of the plasmid pMH28F

<400> 19
gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt tacccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc ttttttatctt ttttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttta aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc ttttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagt 4380

tacctagaga gggtgagaat tgccgaacat gcgcataagt ttcccggaca gatttcaggt 4440

ggtcagcagc aacgcgttgc cattgcgcgt tcgctgtgta tgaagccgaa aattatgttg 4500

tttgatgagc caacgtcggc gctcgatcct gagatggtga aagaggtgct ggatacgatg 4560

attgggctgg cgcagtcggg tatgacaatg ttgtgtgtaa cacatgagat ggggtttgca 4620

cgaaccgtcg ctgaccgggt aatttttatg gatcgtgggg aaatagtgga gcaagctgca 4680

cctgatgaat tttttgcgca tcctaaatca gagcgtacga gggcattttt atcgcaggta 4740

atccattaat tgaatgttag ttcgaaaagc aaaaaggcca tcctttcgga tggcctttcg 4800

cttgatttga tgtctggcag tttatggcgg gcgtcctgcc cgccaccctc cgggccgttg 4860

cttcgcaacg ttcaaatccg gtgacggaag atcacttcgc agaataaata aatcctggtg 4920

tccctgttga taccgggaag ccctgggcca acttttggcg aaaatgagac gttgatcggc 4980

acgtaagagg ttccaacttt caccataatg aaataagatc actaccgggc gtatttttg 5040

agttatcgag attttcagga gctaaggaag ctaaaatgga gaaaaaaatc actggatata 5100

ccaccgttga tatatcccaa tggcatcgta aagaacattt tgaggcattt cagtcagttg 5160

ctcaatgtac ctataaccag accgttcagc tggatattac ggccttttta aagaccgtaa 5220

agaaaaataa gcacaagttt tatccggcct ttattcacat tcttgcccgc ctgatgaatg 5280

ctcatccgga attccgtatg gcaatgaaag acggtgagct ggtgatatgg gatagtgttc 5340

acccttgtta caccgttttc catgagcaaa ctgaaacgtt ttcatcgctc tggagtgaat 5400

accacgacga tttccggcag tttctacaca tatattcgca agatgtggcg tgttacggtg 5460

aaaacctggc ctatttccct aaagggttta ttgagaatat gtttttcgtc tcagccaatc 5520

cctgggtgag tttcaccagt tttgatttaa acgtggccaa tatggacaac ttcttcgccc 5580

ccgttttcac catgggcaaa tattatacgc aaggcgacaa ggtgctgatg ccgctggcga 5640

ttcaggttca tcatgccgtt tgtgatggct tccatgtcgg cagaatgctt aatgaattac 5700

aacagtactg cgatgagtgg cagggcgggg cgtaattttt ttaaggcagt tattggtgcc 5760

cttaaacgcc tggtgctacg cctgaataag tgataataag cggatgaatg gcagaaattc 5820

gaaagcaaat tcgacccggt cgtcggttca gggcagggtc gttaaatagc cgcttatgtc 5880

tattgctggt ttantcggta cccggggatc gcggccgcgg accggatccc atcacatata 5940

cctgccgttc actattattt agtgaaatga gatattatga tattttctga attgtgatta 6000

aaaaggcaac tttatgccca tgcaacagaa actataaaaa atacagagaa tgaaaagaaa 6060

cagatagatt ttttagttct ttaggcccgt agtctgcaaa tccttttatg attttctatc 6120

aaacaaaaga ggaaaataga ccagttgcaa tccaaacgag agtctaatag aatgaggtcg 6180

aaaagtaaat cgcgcgggtt tgttactgat aaagcaggca agacctaaaa tgtgtaaagg 6240

gcaaagtgta tactttggcg tcacccctta catattttag gtctttttt attgtgcgta 6300

actaacttgc catcttcaaa caggagggct ggaagaagca gaccgctaac acagtacata 6360

aaaaaggaga catgaacgat gaacatcaaa aagtttgcaa aacaagcaac agtattaacc 6420

tttactaccg cactgctggc aggaggcgca actcaagcgt ttgcgaaaga aacgaaccaa 6480

aagccatata aggaaacata cggcatttcc catattacac gccatgatat gctgcaaatc 6540

cctgaacagc aaaaaaatga aaaatatcaa gttcctgaat tcgattcgtc cacaattaaa 6600

aatatctctt ctgcaaaagg cctggacgtt tgggacagct ggccattaca aaacgctgac 6660

ggcactgtcg caaactatca cggctaccac atcgtctttg cattagccgg agatcctaaa 6720

aatgcggatg acacatcgat ttacatgttc tatcaaaaag tcggcgaaac ttctattgac 6780

agctggaaaa acgctggccg cgtctttaaa gacagcgaca aattcgatgc aaatgattct 6840

atcctaaaag accaaacaca agaatggtca ggttcagcca catttacatc tgacggaaaa 6900

atccgtttat tctacactga tttctccggt aaacattacg gcaaacaaac actgacaact 6960

gcacaagtta acgtatcagc atcagacagc tctttgaaca tcaacggtgt agaggattat 7020

aaatcaatct ttgacggtga cggaaaaacg tatcaaaatg tacagcagtt catcgatgaa 7080

ggcaactaca gctcaggcga caaccatacg ctgagagatc ctcactacgt agaagataaa 7140

ggccacaaat acttagtatt tgaagcaaac actggaactg aagatggcta ccaaggcgaa 7200

gaatctttat ttaacaaagc atactatggc aaaagcacat cattcttccg tcaagaaagt 7260

caaaaacttc tgcaaagcga taaaaaacgc acggctgagt tagcaaacgg cgctctcggt 7320

atgattgagc taaacgatga ttacacactg aaaaaagtga tgaaaccgct gattgcatct 7380

aacacagtaa cagatgaaat tgaacgcgcg aacgtcttta aaatgaacgg caaatggtac 7440

ctgttcactg actcccgcgg atcaaaaatg acgattgacg gcattacgtc taacgatatt 7500

tacatgcttg gttatgtttc taattcttta actggcccat acaagccgct gaacaaaact 7560

ggccttgtgt taaaaatgga tcttgatcct aacgatgtaa cctttactta ctcacacttc 7620

gctgtacctc aagcgaaagg aaacaatgtc gtgattacaa gctatatgac aaacagagga 7680

ttctacgcag acaaacaatc aacgtttgcg ccgagcttcc tgctgaacat caaaggcaag 7740

aaaacatctg ttgtcaaaga cagcatcctt gaacaaggac aattaacagt taacaaataa 7800

aaacgcaaaa gaaaatgcca atatcctatt ggcattttct tttatttctt ccatttaaat 7860

ggatgcatgc gctagcggag tgtatactgg cttactatgt tggcactgat gagggtgtca 7920

gtgaagtgct tcctcccggc ggatttgtcc tactcgggag agtgttcacc gacaaacaac 7980

agataaaaca aaaggcccag tcttccgact gagccttttg ttttatttga tgtctggcag 8040

ttccctactc tcgcatgggg agaccccaca ctaccatcgg cgctacggcg gtttcacttc 8100

tgagttcggc atggggtcag gtgggaccac cgcgctactg ccgccagaca aattcttttc 8160

taatctgccg aactttaacc taaaaagtgg tgctgatacc cagagtcgaa ctggggacct 8220

cacccttacc aagggtgcgc tctaccaact gagccatatc agcacgctaa atttgatgcc 8280

tggcagttcc ctactctcgc atggggagac cccacactac catcggcgct acggcgtttc 8340

acttctgagt tcggcatggg gtcaggtggg accaccgcgc tacggccgcc aggcaaattc 8400

tgttttatca gaccgcttct gcgttctgat ttaatctgta tcaggctgaa aatcttctct 8460

catccggata acaatttcac acaggaaaca gctatgacca tgattacgcc aagctcgagc 8520

tcgaattcac tggccgtcgt tttacaacgt cgtgactggg aaaaccctgg cgttacccaa 8580

cttaatcgcc ttgcagcaca tccccctttc gccagctggc gtaatagcga agaggcccgc 8640

accgatcgcc cttcccaaca gttgcgcagc ctgaatggcg aatggcgcct gatgcggtat 8700

tttctcctta cgcatctgtg cggtatttca caccgcatat ggtgcactct cagtacaatc 8760

tgctctgatg ccgcatagtt aagccagccc cgacacccgc caacacccgc tgacgaattc 8820

<210> 20
<211> 4774
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(4774)

<400> 20
gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt tacccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc ttttttatctt tttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttta aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc ttttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagc 4380

ggataacaat ttcacacagg aaacagctat gaccatgatt acgccaagct tgcatgcctg 4440

caggtcgact ctagaggatc cccgggtacc gagctcgaat tcactggccg tcgttttaca 4500

acgtcgtgac tgggaaaacc ctggcgttac ccaacttaat cgccttgcag cacatccccc 4560

tttcgccagc tggcgtaata gcgaagaggc ccgcaccgat cgcccttccc aacagttgcg 4620

cagcctgaat ggcgaatggc gcctgatgcg gtattttctc cttacgcatc tgtgcggtat 4680

ttcacaccgc atatggtgca ctctcagtac aatctgctct gatgccgcat agttaagcca 4740

gccccgacac ccgccaacac ccgctgacga attc 4774

<210> 21

<211> 6432

<212> DNA

<213> Escherichia coli

<220>

<221> misc_feature

<222> (1)..(6432)

<223> DNA sequence of the plasmid pMG27

<400> 21

gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt taccccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc ttttttatctt ttttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttttа aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc tttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagc 4380

ggataacaat ttcacacagg aaacagctat gaccatgatt acgccaagct tgcatgcctg 4440

caggtcgacc gttaaatcta tcaccgcaag ggataaatat ctaacaccgt gcgtgttgac 4500

tattttacct ctggcggtga taatggttgc atgtactaat ctagataagg aatatagcca 4560

tgaccgcacc gattcaggat ctgcgtgatg caattgccct gctgcaacag catgataatc 4620

agtatctgga aaccgatcat ccggttgatc cgaatgcaga actggcaggc gtttatcgtc 4680

atattggtgc cggtggcacc gttaaacgtc cgacccgtat tggtccggca atgatgttta 4740

ataacattaa aggttatccg cacagccgta ttctggttgg tatgcatgca agccgtcagc 4800

gtgcagcact gctgctgggt tgtgaagcaa gtcagctggc actggaagtt ggtaaagcag 4860

ttaaaaaacc ggttgcaccg gtggttgttc cggcaagcag cgcaccgtgt caagagcaga 4920

tttttctggc agatgatccg gattttgatc tgcgtaccct gctgcctgca cataccaata 4980

ccccgattga tgcaggtccg ttttttttgtc tgggtctggc cctggcaagc gatccggtgg 5040

atgcaagcct gaccgatgtt accattcatc gtctgtgtgt tcagggtcgt gatgaactga 5100

gcatgttcct ggcagcaggt cgccatattg aagtttttcg tcagaaagca gaagcagcag 5160

gtaaaccgct gccgattacc attaatatgg gtctggaccc agcaatctat attggcgcat 5220

gttttgaagc accgaccacc ccgtttggtt ataatgaact gggtgttgcc ggtgcactgc 5280

gtcagcgtcc ggttgaactg gttcagggtg ttagcgttcc ggaaaaagca attgcacgtg 5340

ccgaaattgt tattgaaggt gaactgctgc ctggtgttcg tgttcgtgaa gatcagcata 5400

ccaattcagg tcatgcaatg ccggaatttc cgggttattg tggtggtgca aatccgagcc 5460

tgccggttat taaagttaaa gccgttacca tgcgcaataa cgcaattctg caaaccctgg 5520

ttggtccggg tgaagaacat accaccctgg caggtctgcc gaccgaagca agcatttgga 5580

atgcagttga agcagcaatt ccgggttttc tgcaaaatgt ttatgcccat accgcaggcg 5640

gtggtaaatt tctgggtatt ctgcaagtga aaaaacgtca gcctgccgat gaaggtcgtc 5700

agggtcaggc agccctgctg gcgctggcaa cctatagcga actgaaaaat atcattctgg 5760

tggatgagga tgtggacatt tttgatagtg atgatattct gtgggcaatg accacccgta 5820

tgcagggtga tgttagcatt accaccattc cgggtattcg cggtcatcag ctggacccga 5880

gccagacacc ggaatattca ccgagcattc gtggtaatgg tattagctgc aaaaccatct 5940

ttgattgtac cgttccgtgg gcactgaaaa gccattttga acgtgcaccg tttgcagatg 6000

ttgatccgcg tccgtttgca cctgaatatt ttgcacgtct ggaaaaaaat cagggcagcg 6060

caaaataagc taataacagg cctgctggta atcgcaggaa tttttatttg gatggatccc 6120

cgggtaccga gctcgaattc actggccgtc gttttacaac gtcgtgactg ggaaaaccct 6180

ggcgttaccc aacttaatcg ccttgcagca catccccctt tcgccagctg gcgtaatagc 6240

gaagaggccc gcaccgatcg cccttcccaa cagttgcgca gcctgaatgg cgaatggcgc 6300

ctgatgcggt attttctcct tacgcatctg tgcggtattt cacaccgcat atggtgcact 6360

ctcagtacaa tctgctctga tgccgcatag ttaagccagc cccgacaccc gccaacaccc 6420

gctgacgaat tc 6432

<210> 22
<211> 7294
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(7294)
<223> DNA sequence of the plasmid pMG31

<400> 22
gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt tacccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc ttttttatctt tttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttta aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc tttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagc 4380

ggataacaat ttcacacagg aaacagctat gaccatgatt acgccaagct tgctattgac 4440

gacagctatg gttcactgtc caccaaccaa aactgtgctc agtaccgcca atatttctcc 4500

cttgaggggt acaaagaggt gtccctagaa gagatccacg ctgtgtaaaa attttacaaa 4560

aaggtattga ctttccctac agggtgtgta ataatttaat tacaggcggg ggcaaccccg 4620

cctgttctgc agaggaggaa tatagccatg gaagtgaaaa tcttcaacac ccaggatgtt 4680

caggattttc tgcgtgttgc aagcggtctg gaacaagagg gtggtaatcc gcgtgttaaa 4740

caaattattc atcgtgttct gagcgacctg tataaagcaa ttgaagatct gaatatcacc 4800

agcgacgaat attgggcagg cgttgcatat ctgaatcagc tgggtgcaaa tcaagaagca 4860

ggtctgctga gtccgggtct gggttttgat cattatctgg atatgcgtat ggatgcagaa 4920

gatgcagcac tgggtattga aaatgcaaca ccgcgtacca ttgaaggtcc gctgtatgtt 4980

gcgggtgcac cggaaagcgt tggttatgca cgcatggatg atggtagcga tccgaatggt 5040

cataccctga ttctgcatgg caccattttt gatgcagatg gtaaaccgct gccgaatgca 5100

aaagttgaaa tttggcatgc aaacaccaaa ggcttttata gccattttga tccgaccggt 5160

gaacagcagg cctttaatat gcgtcgtagc attattaccg atgagaatgg tcagtatcgt 5220

gttcgtacca ttctgcctgc cggttatggt tgtcctccgg aaggtccgac ccagcaactg 5280

ctgaaccaac tgggtcgtca tggtaatcgt ccggcacata ttcattattt tgttagcgca 5340

gatggtcacc gtaaactgac cacccagatt aatgttgccg gtgatccgta tacctatgat 5400

gattttgcat atgccacccg tgaaggtctg gttgttgatg cagttgaaca taccgatccg 5460

gaagcaatta aagccaatga tgtggaaggt ccttttgccg aaatggtgtt tgatctgaaa 5520

ctgacccgtc tggttgatgg tgttgataat caggttgtgg atcgtccgcg tctggcagtt 5580

taatacacca aaatggttca aaattatcag gcgagtgatc atgatcactg gcctgttttt 5640

atttcaggga agggtggaga caattacgtg gataatcaga tcatccaaga aaccgtggat 5700

aaaattctga gcgttctgcc gaatcaggca ggtcagctgg cacgtctggt gcgtctgatg 5760

caatttgcat gcgatccgac cattaccgtt attggcaaat ataaccatgg taaaagccgt 5820

ctgctgaatg aactgattgg caccgatatc tttagcgttg cagataaacg tgaaaccatt 5880

cagctggccg aacataaaca ggatcaggtt cgttggctgg atgcacctgg tctggatgcc 5940

gatgttgcag cagttgatga tcgtcatgca tttgaagcag tttggaccca ggcagatatt 6000

cgtctgtttg ttcatagcgt tcgtgaaggt gaactggatg caaccgaaca ccatctgctg 6060

caacagctga ttgaagatgc cgatcatagc cgtcgtcaga ccattctggt tctgacccag 6120

attgatcaga ttccggatca gaccatcctg acacagatta aaaccagcat tgcacagcag 6180

gttccgaaac tggatatttg ggcagttagc gcaacccgtc atcgtcaggg cattgaaaac 6240

ggtaaaaccc tgctgatcga aaaaagcggt attggtgcac tgcgccatac cctggaacag 6300

gcactggcac aggtgccgag cgcacgtacc tatgaaaaaa atcgtctgct gtcagatctg 6360

caccatcagc tgaaacaact gctgctggat cagaaacatg ttctgcaaca actgcaacag 6420

acacagcaac agcagctgca tgattttgat accggtctga ttaacattct ggacaaaatt 6480

cgtgttgatc tggaaccgat tgtgaatatt gatggtcagg atcaagcact gaatccggat 6540

agctttgcaa ccatgtttaa aaacaccgca gcaaaacagc agcgtgccaa agttcagatt 6600

gcatatagcc gtgcatgcat tgaaatcaac agccatctga ttcgccatgg tgttgttggt 6660

ctgcctgcgg aacagcagac caccattaaa agcattgata ccgtgattgt tgccgtgttt 6720

ggtatcagcg ttaaatttcg tgatcagctg cgtgccctgt tttataccga taccgaacgt 6780

cagcgtctgc aacgtgaatt tcgtttctat tttgaaaaaa gtgccggtcg catgattctg 6840

gcagcaaaaa ttgaacagac catgcgtcag cagggctgta ttcagaatgc catgatggca 6900

ctgcaacaaa tggaaagcgc agcataaaaa cacggacgcc gcaaacggcg tccgaatttc 6960

ttggtcgact ctagaggatc cccgggtacc gagctcgaat tcactggccg tcgttttaca 7020

acgtcgtgac tgggaaaacc ctggcgttac ccaacttaat cgccttgcag cacatccccc 7080

tttcgccagc tggcgtaata gcgaagaggc ccgcaccgat cgcccttccc aacagttgcg 7140

cagcctgaat ggcgaatggc gcctgatgcg gtattttctc cttacgcatc tgtgcggtat 7200

ttcacaccgc atatggtgca ctctcagtac aatctgctct gatgccgcat agttaagcca 7260

gccccgacac ccgccaacac ccgctgacga attc 7294

<210> 23
<211> 8952
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(8952)

<223> DNA sequence of the plasmid pMG33

<400> 23

gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt taccccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc ttttttatctt ttttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttta aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc ttttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagc 4380

ggataacaat ttcacacagg aaacagctat gaccatgatt acgccaagct tgctattgac 4440

gacagctatg gttcactgtc caccaaccaa aactgtgctc agtaccgcca atatttctcc 4500

cttgaggggt acaaagaggt gtccctagaa gagatccacg ctgtgtaaaa attttacaaa 4560

aaggtattga ctttccctac agggtgtgta ataatttaat tacaggcggg ggcaaccccg 4620

cctgttctgc agaggaggaa tatagccatg gaagtgaaaa tcttcaacac ccaggatgtt 4680

caggattttc tgcgtgttgc aagcggtctg gaacaagagg gtggtaatcc gcgtgttaaa 4740

caaattattc atcgtgttct gagcgacctg tataaagcaa ttgaagatct gaatatcacc 4800

agcgacgaat attgggcagg cgttgcatat ctgaatcagc tgggtgcaaa tcaagaagca 4860

ggtctgctga gtccgggtct gggttttgat cattatctgg atatgcgtat ggatgcagaa 4920

gatgcagcac tgggtattga aaatgcaaca ccgcgtacca ttgaaggtcc gctgtatgtt 4980

gcgggtgcac cggaaagcgt tggttatgca cgcatggatg atggtagcga tccgaatggt 5040

cataccctga ttctgcatgg caccattttt gatgcagatg gtaaaccgct gccgaatgca 5100

aaagttgaaa tttggcatgc aaacaccaaa ggcttttata gccattttga tccgaccggt 5160

gaacagcagg cctttaatat gcgtcgtagc attattaccg atgagaatgg tcagtatcgt 5220

gttcgtacca ttctgcctgc cggttatggt tgtcctccgg aaggtccgac ccagcaactg 5280

ctgaaccaac tgggtcgtca tggtaatcgt ccggcacata ttcattattt tgttagcgca 5340

gatggtcacc gtaaactgac cacccagatt aatgttgccg gtgatccgta tacctatgat 5400

gattttgcat atgccacccg tgaaggtctg gttgttgatg cagttgaaca taccgatccg 5460

gaagcaatta aagccaatga tgtggaaggt ccttttgccg aaatggtgtt tgatctgaaa 5520

ctgacccgtc tggttgatgg tgttgataat caggttgtgg atcgtccgcg tctggcagtt 5580

taatacacca aaatggttca aaattatcag gcgagtgatc atgatcactg gcctgttttt 5640

atttcaggga agggtggaga caattacgtg gataatcaga tcatccaaga aaccgtggat 5700

aaaattctga gcgttctgcc gaatcaggca ggtcagctgg cacgtctggt gcgtctgatg 5760

caatttgcat gcgatccgac cattaccgtt attggcaaat ataaccatgg taaaagccgt 5820

ctgctgaatg aactgattgg caccgatatc tttagcgttg cagataaacg tgaaaccatt 5880

cagctggccg aacataaaca ggatcaggtt cgttggctgg atgcacctgg tctggatgcc 5940

gatgttgcag cagttgatga tcgtcatgca tttgaagcag tttggaccca ggcagatatt 6000

cgtctgtttg ttcatagcgt tcgtgaaggt gaactggatg caaccgaaca ccatctgctg 6060

caacagctga ttgaagatgc cgatcatagc cgtcgtcaga ccattctggt tctgacccag 6120

attgatcaga ttccggatca gaccatcctg acacagatta aaaccagcat tgcacagcag 6180

gttccgaaac tggatatttg ggcagttagc gcaacccgtc atcgtcaggg cattgaaaac 6240

ggtaaaaccc tgctgatcga aaaaagcggt attggtgcac tgcgccatac cctggaacag 6300

gcactggcac aggtgccgag cgcacgtacc tatgaaaaaa atcgtctgct gtcagatctg 6360

caccatcagc tgaaacaact gctgctggat cagaaacatg ttctgcaaca actgcaacag 6420

acacagcaac agcagctgca tgattttgat accggtctga ttaacattct ggacaaaatt 6480

cgtgttgatc tggaaccgat tgtgaatatt gatggtcagg atcaagcact gaatccggat 6540

agctttgcaa ccatgtttaa aaacaccgca gcaaaacagc agcgtgccaa agttcagatt 6600

gcatatagcc gtgcatgcat tgaaatcaac agccatctga ttcgccatgg tgttgttggt 6660

ctgcctgcgg aacagcagac caccattaaa agcattgata ccgtgattgt tgccgtgttt 6720

ggtatcagcg ttaaatttcg tgatcagctg cgtgccctgt tttataccga taccgaacgt 6780

cagcgtctgc aacgtgaatt tcgtttctat tttgaaaaaa gtgccggtcg catgattctg 6840

gcagcaaaaa ttgaacagac catgcgtcag cagggctgta ttcagaatgc catgatggca 6900

ctgcaacaaa tggaaagcgc agcataaaaa cacggacgcc gcaaacggcg tccgaatttc 6960

ttggtcgacc gttaaatcta tcaccgcaag ggataaatat ctaacaccgt gcgtgttgac 7020

tattttacct ctggcggtga taatggttgc atgtactaat ctagataagg aatatagcca 7080

tgaccgcacc gattcaggat ctgcgtgatg caattgccct gctgcaacag catgataatc 7140

agtatctgga aaccgatcat ccggttgatc cgaatgcaga actggcaggc gtttatcgtc 7200

atattggtgc cggtggcacc gttaaacgtc cgacccgtat tggtccggca atgatgttta 7260

ataacattaa aggttatccg cacagccgta ttctggttgg tatgcatgca agccgtcagc 7320

gtgcagcact gctgctgggt tgtgaagcaa gtcagctggc actggaagtt ggtaaagcag 7380

ttaaaaaacc ggttgcaccg gtggttgttc cggcaagcag cgcaccgtgt caagagcaga 7440

tttttctggc agatgatccg gattttgatc tgcgtaccct gctgcctgca cataccaata 7500

ccccgattga tgcaggtccg ttttttttgtc tgggtctggc cctggcaagc gatccggtgg 7560

atgcaagcct gaccgatgtt accattcatc gtctgtgtgt tcagggtcgt gatgaactga 7620

gcatgttcct ggcagcaggt cgccatattg aagtttttcg tcagaaagca gaagcagcag 7680

gtaaaccgct gccgattacc attaatatgg gtctggaccc agcaatctat attggcgcat 7740

gttttgaagc accgaccacc ccgtttggtt ataatgaact gggtgttgcc ggtgcactgc 7800

gtcagcgtcc ggttgaactg gttcagggtg ttagcgttcc ggaaaaagca attgcacgtg 7860

ccgaaattgt tattgaaggt gaactgctgc ctggtgttcg tgttcgtgaa gatcagcata 7920

ccaattcagg tcatgcaatg ccggaatttc cgggttattg tggtggtgca aatccgagcc 7980

tgccggttat taaagttaaa gccgttacca tgcgcaataa cgcaattctg caaaccctgg 8040

ttggtccggg tgaagaacat accaccctgg caggtctgcc gaccgaagca agcatttgga 8100

atgcagttga agcagcaatt ccgggttttc tgcaaaatgt ttatgcccat accgcaggcg 8160

gtggtaaatt tctgggtatt ctgcaagtga aaaaacgtca gcctgccgat gaaggtcgtc 8220

agggtcaggc agccctgctg gcgctggcaa cctatagcga actgaaaaat atcattctgg 8280

tggatgagga tgtggacatt tttgatagtg atgatattct gtgggcaatg accacccgta 8340

tgcagggtga tgttagcatt accaccattc cgggtattcg cggtcatcag ctggacccga 8400

gccagacacc ggaatattca ccgagcattc gtggtaatgg tattagctgc aaaaccatct 8460

ttgattgtac cgttccgtgg gcactgaaaa gccattttga acgtgcaccg tttgcagatg 8520

ttgatccgcg tccgtttgca cctgaatatt ttgcacgtct ggaaaaaaat cagggcagcg 8580

caaaataagc taataacagg cctgctggta atcgcaggaa tttttatttg gatggatccc 8640

cgggtaccga gctcgaattc actggccgtc gttttacaac gtcgtgactg ggaaaaccct 8700

ggcgttaccc aacttaatcg ccttgcagca catccccctt tcgccagctg gcgtaatagc 8760

gaagaggccc gcaccgatcg cccttcccaa cagttgcgca gcctgaatgg cgaatggcgc 8820

ctgatgcggt attttctcct tacgcatctg tgcggtattt cacaccgcat atggtgcact 8880

ctcagtacaa tctgctctga tgccgcatag ttaagccagc cccgacaccc gccaacaccc 8940

gctgacgaat tc 8952

<210> 24
<211> 10630
<212> DNA
<213> Escherichia coli

<220>

<221> misc_feature

<222> (1)..(10630)

<223> DNA sequence of the plasmid pMG37

<400> 24

gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt tacccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc tttttatctt tttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttttа aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc tttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagc 4380

ggataacaat ttcacacagg aaacagctat gaccatgatt acgccaagct tgctattgac 4440

gacagctatg gttcactgtc caccaaccaa aactgtgctc agtaccgcca atatttctcc 4500

cttgaggggt acaaagaggt gtccctagaa gagatccacg ctgtgtaaaa attttacaaa 4560

aaggtattga ctttccctac agggtgtgta ataatttaat tacaggcggg ggcaaccccg 4620

cctgttctgc agaggaggaa tatagccatg gaagtgaaaa tcttcaacac ccaggatgtt 4680

caggattttc tgcgtgttgc aagcggtctg gaacaagagg gtggtaatcc gcgtgttaaa 4740

caaattattc atcgtgttct gagcgacctg tataaagcaa ttgaagatct gaatatcacc 4800

agcgacgaat attgggcagg cgttgcatat ctgaatcagc tgggtgcaaa tcaagaagca 4860

ggtctgctga gtccgggtct gggttttgat cattatctgg atatgcgtat ggatgcagaa 4920

gatgcagcac tgggtattga aaatgcaaca ccgcgtacca ttgaaggtcc gctgtatgtt 4980

gcgggtgcac cggaaagcgt tggttatgca cgcatggatg atggtagcga tccgaatggt 5040

cataccctga ttctgcatgg caccattttt gatgcagatg gtaaaccgct gccgaatgca 5100

aaagttgaaa tttggcatgc aaacaccaaa ggcttttata gccattttga tccgaccggt 5160

gaacagcagg cctttaatat gcgtcgtagc attattaccg atgagaatgg tcagtatcgt 5220

gttcgtacca ttctgcctgc cggttatggt tgtcctccgg aaggtccgac ccagcaactg 5280

ctgaaccaac tgggtcgtca tggtaatcgt ccggcacata ttcattattt tgttagcgca 5340

gatggtcacc gtaaactgac cacccagatt aatgttgccg gtgatccgta tacctatgat 5400

gattttgcat atgccacccg tgaaggtctg gttgttgatg cagttgaaca taccgatccg 5460

gaagcaatta aagccaatga tgtggaaggt ccttttgccg aaatggtgtt tgatctgaaa 5520

ctgacccgtc tggttgatgg tgttgataat caggttgtgg atcgtccgcg tctggcagtt 5580

taatacacca aaatggttca aaattatcag gcgagtgatc atgatcactg gcctgttttt 5640

atttcaggga agggtggaga caattacgtg gataatcaga tcatccaaga aaccgtggat 5700

aaaattctga gcgttctgcc gaatcaggca ggtcagctgg cacgtctggt gcgtctgatg 5760

caatttgcat gcgatccgac cattaccgtt attggcaaat ataaccatgg taaaagccgt 5820

ctgctgaatg aactgattgg caccgatatc tttagcgttg cagataaacg tgaaaccatt 5880

cagctggccg aacataaaca ggatcaggtt cgttggctgg atgcacctgg tctggatgcc 5940

gatgttgcag cagttgatga tcgtcatgca tttgaagcag tttggaccca ggcagatatt 6000

cgtctgtttg ttcatagcgt tcgtgaaggt gaactggatg caaccgaaca ccatctgctg 6060

caacagctga ttgaagatgc cgatcatagc cgtcgtcaga ccattctggt tctgacccag 6120

attgatcaga ttccggatca gaccatcctg acacagatta aaaccagcat tgcacagcag 6180

gttccgaaac tggatatttg ggcagttagc gcaacccgtc atcgtcaggg cattgaaaac 6240

ggtaaaaccc tgctgatcga aaaaagcggt attggtgcac tgcgccatac cctggaacag 6300

gcactggcac aggtgccgag cgcacgtacc tatgaaaaaa atcgtctgct gtcagatctg 6360

caccatcagc tgaaacaact gctgctggat cagaaacatg ttctgcaaca actgcaacag 6420

acacagcaac agcagctgca tgattttgat accggtctga ttaacattct ggacaaaatt 6480

cgtgttgatc tggaaccgat tgtgaatatt gatggtcagg atcaagcact gaatccggat 6540

agctttgcaa ccatgtttaa aaacaccgca gcaaaacagc agcgtgccaa agttcagatt 6600

gcatatagcc gtgcatgcat tgaaatcaac agccatctga ttcgccatgg tgttgttggt 6660

ctgcctgcgg aacagcagac caccattaaa agcattgata ccgtgattgt tgccgtgttt 6720

ggtatcagcg ttaaatttcg tgatcagctg cgtgccctgt tttataccga taccgaacgt 6780

cagcgtctgc aacgtgaatt tcgtttctat tttgaaaaaa gtgccggtcg catgattctg 6840

gcagcaaaaa ttgaacagac catgcgtcag cagggctgta ttcagaatgc catgatggca 6900

ctgcaacaaa tggaaagcgc agcataaaaa cacggacgcc gcaaacggcg tccgaatttc 6960

ttggtcgacc gttaaatcta tcaccgcaag ggataaatat ctaacaccgt gcgtgttgac 7020

tattttacct ctggcggtga taatggttgc atgtactaat ctagataagg aatatagcca 7080

tgaccgcacc gattcaggat ctgcgtgatg caattgccct gctgcaacag catgataatc 7140

agtatctgga aaccgatcat ccggttgatc cgaatgcaga actggcaggc gtttatcgtc 7200

atattggtgc cggtggcacc gttaaacgtc cgacccgtat tggtccggca atgatgttta 7260

ataacattaa aggttatccg cacagccgta ttctggttgg tatgcatgca agccgtcagc 7320

gtgcagcact gctgctgggt tgtgaagcaa gtcagctggc actggaagtt ggtaaagcag 7380

ttaaaaaacc ggttgcaccg gtggttgttc cggcaagcag cgcaccgtgt caagagcaga 7440

tttttctggc agatgatccg gattttgatc tgcgtaccct gctgcctgca cataccaata 7500

ccccgattga tgcaggtccg ttttttttgtc tgggtctggc cctggcaagc gatccggtgg 7560

atgcaagcct gaccgatgtt accattcatc gtctgtgtgt tcagggtcgt gatgaactga 7620

gcatgttcct ggcagcaggt cgccatattg aagtttttcg tcagaaagca gaagcagcag 7680

gtaaaccgct gccgattacc attaatatgg gtctggaccc agcaatctat attggcgcat 7740

gttttgaagc accgaccacc ccgtttggtt ataatgaact gggtgttgcc ggtgcactgc 7800

gtcagcgtcc ggttgaactg gttcagggtg ttagcgttcc ggaaaaagca attgcacgtg 7860

ccgaaattgt tattgaaggt gaactgctgc ctggtgttcg tgttcgtgaa gatcagcata 7920

ccaattcagg tcatgcaatg ccggaatttc cgggttattg tggtggtgca aatccgagcc 7980

tgccggttat taaagttaaa gccgttacca tgcgcaataa cgcaattctg caaaccctgg 8040

ttggtccggg tgaagaacat accaccctgg caggtctgcc gaccgaagca agcatttgga 8100

atgcagttga agcagcaatt ccgggttttc tgcaaaatgt ttatgcccat accgcaggcg 8160

gtggtaaatt tctgggtatt ctgcaagtga aaaaacgtca gcctgccgat gaaggtcgtc 8220

agggtcaggc agccctgctg gcgctggcaa cctatagcga actgaaaaat atcattctgg 8280

tggatgagga tgtggacatt tttgatagtg atgatattct gtgggcaatg accacccgta 8340

tgcagggtga tgttagcatt accaccattc cgggtattcg cggtcatcag ctggacccga 8400

gccagacacc ggaatattca ccgagcattc gtggtaatgg tattagctgc aaaaccatct 8460

ttgattgtac cgttccgtgg gcactgaaaa gccattttga acgtgcaccg tttgcagatg 8520

ttgatccgcg tccgtttgca cctgaatatt ttgcacgtct ggaaaaaaat cagggcagcg 8580

caaaataagc taataacagg cctgctggta atcgcaggaa tttttatttg gatggatccg 8640

cctacctagc ttccaagaaa gatatcctaa cagcacaaga gcggaaagat gttttgttct 8700

acatccagaa caacctctgc taaaattcct gaaaaatttt gcaaaaagtt gttgacttta 8760

tctacaaggt gtggtataat aatcttaaca acagcaggac gctcccgggt tgaggaaaac 8820

ctaatgaaac tgaccagcct gcgtgttagc ctgctggcac tgggtctggt taccagcggt 8880

tttgcagcag cagaaaccta taccgttgat cgttatcagg atgatagcga aaaaggtagc 8940

ctgcgttggg caattgaaca gagcaatgca aatagcgcac aagaaaacca gattctgatt 9000

caggcagttg gtaaagcacc gtatgttatc aaagttgata aaccgctgcc tccgattaaa 9060

agcagcgtta aaatcattgg caccgagtgg gataaaaccg gtgaatttat tgcaattgat 9120

ggcagcaact atatcaaagg cgaaggtgaa aaagcatgtc cgggtgcaaa tccgggtcag 9180

tatggcacca atgttcgtac catgaccctg cctggtctgg ttctgcaaga tgttaatggt 9240

gttaccctga aaggtctgga tgttcatcgt ttttgtattg gtgttctggt taatcgcagc 9300

agcaataacc tgattcagca taatcgtatc agcaacaatt atggtggtgc cggtgttatg 9360

attaccggtg atgatggtaa aggtaatccg accagcacca ccaccaataa taacaaagtt 9420

ctggataacg tgttcatcga taatggtgat ggtctggaac tgacccgtgg tgcagcattt 9480

aatctgattg caaataacct gtttaccagc acaaaagcca atccggaacc gagccagggt 9540

attgaaattc tgtggggtaa tgataatgcc gtggtgggta acaaattcga aaactattca 9600

gatggcctgc aaatcaattg gggtaaacgt aactatatcg cctataacga actgaccaat 9660

aacagcctgg gtttcaatct gacaggtgat ggtaacattt tcgacagcaa taaagtgcat 9720

ggtaaccgta ttggtattgc cattcgtagt gaaaaagatg ccaatgcacg tattaccctg 9780

accaaaaatc agatttggga taacggcaaa gatatcaaac gttgtgaagc cggtggtagc 9840

tgtgttccga atcagcgtct gggtgcaatt gtttttggtg ttccggcact ggaacatgaa 9900

ggttttgttg gtagccgtgg cggtggtgtt gttattgaac cggcaaaact gcaaaaaacc 9960

tgcacccagc cgaaccagca gaattgtaat gcaattccta atcagggtat tcaggcaccg 10020

aaactgacag ttagcaaaaa acagctgacc gttgaagtta aaggcacccc taatcagcgt 10080

tataatgtgg aatttttgg caatcgtaat gccagcagca gcgaagcaga acagtatctg 10140

ggtagcattg ttgttgttac cgatcatcag ggtctggcaa aagcaaattg ggctccgaaa 10200

gttagcatgc cgagcgttac cgcaaatgtg acagatcatc tgggtgcgac cagcgaactg 10260

agcagcgcag ttaaaatgcg ttaaatgcat gcgcgccgcg ttcgcgcggc gctttttttt 10320

ggtaccgagc tcgaattcac tggccgtcgt tttacaacgt cgtgactggg aaaaccctgg 10380

cgttacccaa cttaatcgcc ttgcagcaca tccccctttc gccagctggc gtaatagcga 10440

agaggcccgc accgatcgcc cttcccaaca gttgcgcagc ctgaatggcg aatggcgcct 10500

gatgcggtat tttctcctta cgcatctgtg cggtatttca caccgcatat ggtgcactct 10560

cagtacaatc tgctctgatg ccgcatagtt aagccagccc cgacacccgc caacacccgc 10620

tgacgaattc 10630

<210> 25
<211> 6452
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(6452)

<223> DNA sequence of the plasmid pMG39

<400> 25

gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt taccccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc ttttttatctt ttttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttta aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc ttttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagc 4380

ggataacaat ttcacacagg aaacagctat gaccatgatt acgccaagct tgcatgcctg 4440

caggtcgact ctagaggatc cgcctaccta gcttccaaga aagatatcct aacagcacaa 4500

gagcggaaag atgttttgtt ctacatccag aacaacctct gctaaaattc ctgaaaaatt 4560

ttgcaaaaag ttgttgactt tatctacaag gtgtggtata ataatcttaa caacagcagg 4620

acgctcccgg gttgaggaaa acctaatgaa actgaccagc ctgcgtgtta gcctgctggc 4680

actgggtctg gttaccagcg gttttgcagc agcagaaacc tataccgttg atcgttatca 4740

ggatgatagc gaaaaaggta gcctgcgttg ggcaattgaa cagagcaatg caaatagcgc 4800

acaagaaaac cagattctga ttcaggcagt tggtaaagca ccgtatgtta tcaaagttga 4860

taaaccgctg cctccgatta aaagcagcgt taaaatcatt ggcaccgagt gggataaaac 4920

cggtgaattt attgcaattg atggcagcaa ctatatcaaa ggcgaaggtg aaaaagcatg 4980

tccgggtgca aatccgggtc agtatggcac caatgttcgt accatgaccc tgcctggtct 5040

ggttctgcaa gatgttaatg gtgttaccct gaaaggtctg gatgttcatc gtttttgtat 5100

tggtgttctg gttaatcgca gcagcaataa cctgattcag cataatcgta tcagcaacaa 5160

ttatggtggt gccggtgtta tgattaccgg tgatgatggt aaaggtaatc cgaccagcac 5220

caccaccaat aataacaaag ttctggataa cgtgttcatc gataatggtg atggtctgga 5280

actgacccgt ggtgcagcat ttaatctgat tgcaaataac ctgtttacca gcacaaaagc 5340

caatccggaa ccgagccagg gtattgaaat tctgtggggt aatgataatg ccgtggtggg 5400

taacaaattc gaaaactatt cagatggcct gcaaatcaat tggggtaaac gtaactatat 5460

cgcctataac gaactgacca ataacagcct gggtttcaat ctgacaggtg atggtaacat 5520

tttcgacagc aataaagtgc atggtaaccg tattggtatt gccattcgta gtgaaaaaga 5580

tgccaatgca cgtattaccc tgaccaaaaa tcagatttgg gataacggca aagatatcaa 5640

acgttgtgaa gccggtggta gctgtgttcc gaatcagcgt ctgggtgcaa ttgtttttgg 5700

tgttccggca ctggaacatg aaggttttgt tggtagccgt ggcggtggtg ttgttattga 5760

accggcaaaa ctgcaaaaaa cctgcaccca gccgaaccag cagaattgta atgcaattcc 5820

taatcagggt attcaggcac cgaaactgac agttagcaaa aaacagctga ccgttgaagt 5880

taaaggcacc cctaatcagc gttataatgt ggaatttttt ggcaatcgta atgccagcag 5940

cagcgaagca gaacagtatc tgggtagcat tgttgttgtt accgatcatc agggtctggc 6000

aaaagcaaat tgggctccga aagttagcat gccgagcgtt accgcaaatg tgacagatca 6060

tctgggtgcg accagcgaac tgagcagcgc agttaaaatg cgttaaatgc atgcgcgccg 6120

cgttcgcgcg gcgctttttt ttggtaccga gctcgaattc actggccgtc gttttacaac 6180

gtcgtgactg ggaaaaccct ggcgttaccc aacttaatcg ccttgcagca catccccctt 6240

tcgccagctg gcgtaatagc gaagaggccc gcaccgatcg cccttcccaa cagttgcgca 6300

gcctgaatgg cgaatggcgc ctgatgcggt attttctcct tacgcatctg tgcggtattt 6360

cacaccgcat atggtgcact ctcagtacaa tctgctctga tgccgcatag ttaagccagc 6420

cccgacaccc gccaacaccc gctgacgaat tc 6452

<210> 26
<211> 10012
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(10012)
<223> DNA sequence of the plasmid pMG47

<400> 26
gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt taccccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc tttttatctt tttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttta aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc tttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagc 4380

ggataacaat ttcacacagg aaacagctat gaccatgatt acgccaagct tgctattgac 4440

gacagctatg gttcactgtc caccaaccaa aactgtgctc agtaccgcca atatttctcc 4500

cttgaggggt acaaagaggt gtccctagaa gagatccacg ctgtgtaaaa attttacaaa 4560

aaggtattga ctttccctac agggtgtgta ataatttaat tacaggcggg ggcaaccccg 4620

cctgttctgc agaggaggaa tatagccatg gaagtgaaaa tcttcaacac ccaggatgtt 4680

caggattttc tgcgtgttgc aagcggtctg gaacaagagg gtggtaatcc gcgtgttaaa 4740

caaattattc atcgtgttct gagcgacctg tataaagcaa ttgaagatct gaatatcacc 4800

agcgacgaat attgggcagg cgttgcatat ctgaatcagc tgggtgcaaa tcaagaagca 4860

ggtctgctga gtccgggtct gggttttgat cattatctgg atatgcgtat ggatgcagaa 4920

gatgcagcac tgggtattga aaatgcaaca ccgcgtacca ttgaaggtcc gctgtatgtt 4980

gcgggtgcac cggaaagcgt tggttatgca cgcatggatg atggtagcga tccgaatggt 5040

cataccctga ttctgcatgg caccattttt gatgcagatg gtaaaccgct gccgaatgca 5100

aaagttgaaa tttggcatgc aaacaccaaa ggcttttata gccattttga tccgaccggt 5160

gaacagcagg cctttaatat gcgtcgtagc attattaccg atgagaatgg tcagtatcgt 5220

gttcgtacca ttctgcctgc cggttatggt tgtcctccgg aaggtccgac ccagcaactg 5280

ctgaaccaac tgggtcgtca tggtaatcgt ccggcacata ttcattattt tgttagcgca 5340

gatggtcacc gtaaactgac cacccagatt aatgttgccg gtgatccgta tacctatgat 5400

gattttgcat atgccacccg tgaaggtctg gttgttgatg cagttgaaca taccgatccg 5460

gaagcaatta aagccaatga tgtggaaggt ccttttgccg aaatggtgtt tgatctgaaa 5520

ctgacccgtc tggttgatgg tgttgataat caggttgtgg atcgtccgcg tctggcagtt 5580

taatacacca aaatggttca aaattatcag gcgagtgatc atgatcactg gcctgttttt 5640

atttcaggga agggtggaga caattacgtg gataatcaga tcatccaaga aaccgtggat 5700

aaaattctga gcgttctgcc gaatcaggca ggtcagctgg cacgtctggt gcgtctgatg 5760

caatttgcat gcgatccgac cattaccgtt attggcaaat ataaccatgg taaaagccgt 5820

ctgctgaatg aactgattgg caccgatatc tttagcgttg cagataaacg tgaaaccatt 5880

cagctggccg aacataaaca ggatcaggtt cgttggctgg atgcacctgg tctggatgcc 5940

gatgttgcag cagttgatga tcgtcatgca tttgaagcag tttggaccca ggcagatatt 6000

cgtctgtttg ttcatagcgt tcgtgaaggt gaactggatg caaccgaaca ccatctgctg 6060

caacagctga ttgaagatgc cgatcatagc cgtcgtcaga ccattctggt tctgacccag 6120

attgatcaga ttccggatca gaccatcctg acacagatta aaaccagcat tgcacagcag 6180

gttccgaaac tggatatttg ggcagttagc gcaacccgtc atcgtcaggg cattgaaaac 6240

ggtaaaaccc tgctgatcga aaaaagcggt attggtgcac tgcgccatac cctggaacag 6300

gcactggcac aggtgccgag cgcacgtacc tatgaaaaaa atcgtctgct gtcagatctg 6360

caccatcagc tgaaacaact gctgctggat cagaaacatg ttctgcaaca actgcaacag 6420

acacagcaac agcagctgca tgattttgat accggtctga ttaacattct ggacaaaatt 6480

cgtgttgatc tggaaccgat tgtgaatatt gatggtcagg atcaagcact gaatccggat 6540

agctttgcaa ccatgtttaa aaacaccgca gcaaaacagc agcgtgccaa agttcagatt 6600

gcatatagcc gtgcatgcat tgaaatcaac agccatctga ttcgccatgg tgttgttggt 6660

ctgcctgcgg aacagcagac caccattaaa agcattgata ccgtgattgt tgccgtgttt 6720

ggtatcagcg ttaaatttcg tgatcagctg cgtgccctgt tttataccga taccgaacgt 6780

cagcgtctgc aacgtgaatt tcgtttctat tttgaaaaaa gtgccggtcg catgattctg 6840

gcagcaaaaa ttgaacagac catgcgtcag cagggctgta ttcagaatgc catgatggca 6900

ctgcaacaaa tggaaagcgc agcataaaaa cacggacgcc gcaaacggcg tccgaatttc 6960

ttggtcgacc gttaaatcta tcaccgcaag ggataaatat ctaacaccgt gcgtgttgac 7020

tattttacct ctggcggtga taatggttgc atgtactaat ctagataagg aatatagcca 7080

tgaccgcacc gattcaggat ctgcgtgatg caattgccct gctgcaacag catgataatc 7140

agtatctgga aaccgatcat ccggttgatc cgaatgcaga actggcaggc gtttatcgtc 7200

atattggtgc cggtggcacc gttaaacgtc cgacccgtat tggtccggca atgatgttta 7260

ataacattaa aggttatccg cacagccgta ttctggttgg tatgcatgca agccgtcagc 7320

gtgcagcact gctgctgggt tgtgaagcaa gtcagctggc actggaagtt ggtaaagcag 7380

ttaaaaaacc ggttgcaccg gtggttgttc cggcaagcag cgcaccgtgt caagagcaga 7440

tttttctggc agatgatccg gattttgatc tgcgtaccct gctgcctgca cataccaata 7500

ccccgattga tgcaggtccg ttttttttgtc tgggtctggc cctggcaagc gatccggtgg 7560

atgcaagcct gaccgatgtt accattcatc gtctgtgtgt tcagggtcgt gatgaactga 7620

gcatgttcct ggcagcaggt cgccatattg aagtttttcg tcagaaagca gaagcagcag 7680

gtaaaccgct gccgattacc attaatatgg gtctggaccc agcaatctat attggcgcat 7740

gttttgaagc accgaccacc ccgtttggtt ataatgaact gggtgttgcc ggtgcactgc 7800

gtcagcgtcc ggttgaactg gttcagggtg ttagcgttcc ggaaaaagca attgcacgtg 7860

ccgaaattgt tattgaaggt gaactgctgc ctggtgttcg tgttcgtgaa gatcagcata 7920

ccaattcagg tcatgcaatg ccggaatttc cgggttattg tggtggtgca aatccgagcc 7980

tgccggttat taaagttaaa gccgttacca tgcgcaataa cgcaattctg caaaccctgg 8040

ttggtccggg tgaagaacat accaccctgg caggtctgcc gaccgaagca agcatttgga 8100

atgcagttga agcagcaatt ccgggttttc tgcaaaatgt ttatgcccat accgcaggcg 8160

gtggtaaatt tctgggtatt ctgcaagtga aaaaacgtca gcctgccgat gaaggtcgtc 8220

agggtcaggc agccctgctg gcgctggcaa cctatagcga actgaaaaat atcattctgg 8280

tggatgagga tgtggacatt tttgatagtg atgatattct gtgggcaatg accacccgta 8340

tgcagggtga tgttagcatt accaccattc cgggtattcg cggtcatcag ctggacccga 8400

gccagacacc ggaatattca ccgagcattc gtggtaatgg tattagctgc aaaaccatct 8460

ttgattgtac cgttccgtgg gcactgaaaa gccattttga acgtgcaccg tttgcagatg 8520

ttgatccgcg tccgtttgca cctgaatatt ttgcacgtct ggaaaaaaat cagggcagcg 8580

caaaataagc taataacagg cctgctggta atcgcaggaa tttttatttg gatggatccg 8640

cctacctagc ttccaagaaa gatatcctaa cagcacaaga gcggaaagat gttttgttct 8700

acatccagaa caacctctgc taaaattcct gaaaaatttt gcaaaaagtt gttgacttta 8760

tctacaaggt gtggtataat aatcttaaca acagcaggac gctcccgggt tgaggaaaac 8820

ctaatgaaat atagcctgtg caccattagc tttcgtcacc agctgattag ctttaccgat 8880

attgttcagt ttgcctatga aaacggcttt gaaggtattg aactgtgggg cacccatgca 8940

cagaatctgt atatgcaaga atatgaaacc accgaacgtg aactgaattg cctgaaagat 9000

aaaaccctgg aaattaccat gatcagcgat tatctggata ttagcctgag cgcagatttt 9060

gaaaaaacca tcgaaaaatg tgaacagctg gcaattctgg ccaattggtt taaaacgaac 9120

aaaattcgta cctttgccgg tcagaaaggt agtgcagatt ttagccagca agaacgtcaa 9180

gagtatgtga atcgtattcg catgatttgt gaactgtttg cccagcataa tatgtatgtt 9240

ctgctggaaa cccatccgaa taccctgacc gataccctgc cgagcaccct ggaactgctg 9300

ggtgaagttg atcatccgaa tctgaaaatc aacctggatt ttctgcatat ctgggaaagc 9360

ggtgcagatc cggttgatag ctttcagcag ctgcgtccgt ggattcagca ttatcacttt 9420

aaaaacatta gcagcgcaga ctatctgcat gtgtttgaac cgaataatgt ttatgcagca 9480

gcaggtaatc gtaccggtat ggttccgctg tttgaaggca ttgttaacta tgatgaaatc 9540

atccaagaag tgcgcgatac cgatcatttt gcaagcctgg aatggtttgg tcataacgca 9600

aaagatattc tgaaagccga aatgaaagtg ctgaccaatc gtaatctgga agttgttacc 9660

agctaaatgc atgcgcgccg cgttcgcgcg gcgctttttt ttggtaccga gctcgaattc 9720

actggccgtc gttttacaac gtcgtgactg ggaaaaccct ggcgttaccc aacttaatcg 9780

ccttgcagca catccccctt tcgccagctg gcgtaatagc gaagaggccc gcaccgatcg 9840

cccttcccaa cagttgcgca gcctgaatgg cgaatggcgc ctgatgcggt attttctcct 9900

tacgcatctg tgcggtattt cacaccgcat atggtgcact ctcagtacaa tctgctctga 9960

tgccgcatag ttaagccagc cccgacaccc gccaacaccc gctgacgaat tc 10012

<210> 27
<211> 10249
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(10249)
<223> DNA sequence of the plasmid pMG70

<400> 27
gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg tgcattagcc 60

agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat cagagggcag 120

gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca taaaacgccc 180

tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat gaatccataa 240

aaggcgcctg tagtgccatt taccccccatt cactgccaga gccgtgagcg cagcgaactg 300

aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa ggaatattca 360

gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa ggtctgtttt 420

gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact gactaaagta 480

gtgagttata cacagggctg ggatctattc tttttatctt tttttattct ttctttattc 540

tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta gcggaattta 600

cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat ttacagatac 660

ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc aattggtata 720

gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt ttcaaagcaa 780

atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta attttatgct 840

gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg acggtatcgt 900

tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct tatggtgtat 960

tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat cctttggtta 1020

aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa aaattagaat 1080

tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc ataaaatata 1140

atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat gagtggttat 1200

taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc cttgatgaat 1260

ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt aaccaatggg 1320

ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg gtggttgata 1380

agcgaggccg cccgactgat acgttgattt tccaagttga actagataga caaatggatc 1440

tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata ccaacaacca 1500

ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat gctttaactg 1560

caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa agtaagcatg 1620

atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta gagaacatac 1680

tggctaaata cggaaggatc tgaggttctt atggctcttg tatctatcag tgaagcatca 1740

agactaacaa acaaaagtag aacaactgtt caccgttaga tatcaaaggg aaaactgtcc 1800

atatgcacag atgaaaacgg tgtaaaaaag atagatacat cagagctttt acgagttttt 1860

ggtgcattta aagctgttca ccatgaacag atcgacaatg taacagatga acagcatgta 1920

acacctaata gaacaggtga aaccagtaaa acaaagcaac tagaacatga aattgaacac 1980

ctgagacaac ttgttacagc tcaacagtca cacatagaca gcctgaaaca ggcgatgctg 2040

cttatcgaat caaagctgcc gacaacacgg gagccagtga cgcctcccgt ggggaaaaaa 2100

tcatggcaat tctggaagaa atagcgcttt cagccggcaa acctgaagcc ggatctgcga 2160

ttctgataac aaactagcaa caccagaaca gcccgtttgc gggcagcaaa acccgttatg 2220

cttgtaaacc gttttgtgaa aaaatttta aaataaaaaa ggggacctct agggtcccca 2280

attaattagt aatataatct attaaaggtc attcaaaagg tcatccaccg gatcaattcc 2340

cctgctcgcg caggctgggt gccaagctct cgggtaacat caaggcccga tccttggagc 2400

ccttgccctc ccgcacgatg atcgtgccgt gatcgaaatc cagatccttg acccgcagtt 2460

gcaaaccctc actgatccgc atgcccgttc catacagaag ctgggcgaac aaacgatgct 2520

cgccttccag aaaaccgagg atgcgaacca cttcatccgg ggtcagcacc accggcaagc 2580

gccgcgacgg ccgaggtctt ccgatctcct gaagccaggg cagatccgtg cacagcacct 2640

tgccgtagaa gaacagcaag gccgccaatg cctgacgatg cgtggagacc gaaaccttgc 2700

gctcgttcgc cagccaggac agaaatgcct cgacttcgct gctgcccaag gttgccgggt 2760

gacgcacacc gtggaaacgg atgaaggcac gaacccagtg gacataagcc tgttcggttc 2820

gtaagctgta atgcaagtag cgtatgcgct cacgcaactg gtccagaacc ttgaccgaac 2880

gcagcggtgg taacggcgca gtggcggttt tcatggcttg ttatgactgt ttttttgggg 2940

tacagtctat gcctcgggca tccaagcagc aagcgcgtta cgccgtgggt cgatgtttga 3000

tgttatggag cagcaacgat gttacgcagc agggcagtcg ccctaaaaca aagttaaaca 3060

tcatgaggga agcggtgatc gccgaagtat cgactcaact atcagaggta gttggcgtca 3120

tcgagcgcca tctcgaaccg acgttgctgg ccgtacattt gtacggctcc gcagtggatg 3180

gcggcctgaa gccacacagt gatattgatt tgctggttac ggtgaccgta aggcttgatg 3240

aaacaacgcg gcgagctttg atcaacgacc ttttggaaac ttcggcttcc cctggagaga 3300

gcgagattct ccgcgctgta gaagtcacca ttgttgtgca cgacgacatc attccgtggc 3360

gttatccagc taagcgcgaa ctgcaatttg gagaatggca gcgcaatgac attcttgcag 3420

gtatcttcga gccagccacg atcgacattg atctggctat cttgctgaca aaagcaagag 3480

aacatagcgt tgccttggta ggtccagcgg cggaggaact ctttgatccg gttcctgaac 3540

aggatctatt tgaggcgcta aatgaaacct taacgctatg gaactcgccg cccgactggg 3600

ctggcgatga gcgaaatgta gtgcttacgt tgtcccgcat ttggtacagc gcagtaaccg 3660

gcaaaatcgc gccgaaggat gtcgctgccg actgggcaat ggagcgcctg ccggcccagt 3720

atcagcccgt catacttgaa gctagacagg cttatcttgg acaagaagaa gatcgcttgg 3780

cctcgcgcgc agatcagttg gaagaatttg tccactacgt gaaaggcgag atcaccaagg 3840

tagtcggcaa ataatgtcta acaattcgtt caagccgacg ccgcttcgcg gcgcggctta 3900

actcaagcgt tagatgcact aagcacataa ttgctcacag ccaaactatc aggtcaagtc 3960

tgcttttatt atttttaagc gtgcataata agccctacac aaattgggag atatatcatg 4020

aaaggctggc tttttcttgt tatcgcaata gttggcgaag taatcgcaac atccgcatta 4080

aaatctagcg agggctttac taagctgatc cggtggatga ccttttgaat gacctttaat 4140

agattatatt actaattaat tggggaccct agaggtcccc ttttttattt taaaaatttt 4200

ttcacaaaac ggtttacaag catacgttgg ccgattcatt aatgcagctg gcacgacagg 4260

tttcccgact ggaaagcggg cagtgagcgc aacgcaatta atgtgagtta gctcactcat 4320

taggcacccc aggctttaca ctttatgctt ccggctcgta tgttgtgtgg aattgtgagc 4380

ggataacaat ttcacacagg aaacagctat gaccatgatt acgccaagct tgctattgac 4440

gacagctatg gttcactgtc caccaaccaa aactgtgctc agtaccgcca atatttctcc 4500

cttgaggggt acaaagaggt gtccctagaa gagatccacg ctgtgtaaaa attttacaaa 4560

aaggtattga ctttccctac agggtgtgta ataatttaat tacaggcggg ggcaaccccg 4620

cctgttctgc agaggaggaa tatagccatg gaagtgaaaa tcttcaacac ccaggatgtt 4680

caggattttc tgcgtgttgc aagcggtctg gaacaagagg gtggtaatcc gcgtgttaaa 4740

caaattattc atcgtgttct gagcgacctg tataaagcaa ttgaagatct gaatatcacc 4800

agcgacgaat attgggcagg cgttgcatat ctgaatcagc tgggtgcaaa tcaagaagca 4860

ggtctgctga gtccgggtct gggttttgat cattatctgg atatgcgtat ggatgcagaa 4920

gatgcagcac tgggtattga aaatgcaaca ccgcgtacca ttgaaggtcc gctgtatgtt 4980

gcgggtgcac cggaaagcgt tggttatgca cgcatggatg atggtagcga tccgaatggt 5040

cataccctga ttctgcatgg caccattttt gatgcagatg gtaaaccgct gccgaatgca 5100

aaagttgaaa tttggcatgc aaacaccaaa ggcttttata gccattttga tccgaccggt 5160

gaacagcagg cctttaatat gcgtcgtagc attattaccg atgagaatgg tcagtatcgt 5220

gttcgtacca ttctgcctgc cggttatggt tgtcctccgg aaggtccgac ccagcaactg 5280

ctgaaccaac tgggtcgtca tggtaatcgt ccggcacata ttcattattt tgttagcgca 5340

gatggtcacc gtaaactgac cacccagatt aatgttgccg gtgatccgta tacctatgat 5400

gattttgcat atgccacccg tgaaggtctg gttgttgatg cagttgaaca taccgatccg 5460

gaagcaatta aagccaatga tgtggaaggt ccttttgccg aaatggtgtt tgatctgaaa 5520

ctgacccgtc tggttgatgg tgttgataat caggttgtgg atcgtccgcg tctggcagtt 5580

taatacacca aaatggttca aaattatcag gcgagtgatc atgatcactg gcctgttttt 5640

atttcaggga agggtggaga caattacgtg gataatcaga tcatccaaga aaccgtggat 5700

aaaattctga gcgttctgcc gaatcaggca ggtcagctgg cacgtctggt gcgtctgatg 5760

caatttgcat gcgatccgac cattaccgtt attggcaaat ataaccatgg taaaagccgt 5820

ctgctgaatg aactgattgg caccgatatc tttagcgttg cagataaacg tgaaaccatt 5880

cagctggccg aacataaaca ggatcaggtt cgttggctgg atgcacctgg tctggatgcc 5940

gatgttgcag cagttgatga tcgtcatgca tttgaagcag tttggaccca ggcagatatt 6000

cgtctgtttg ttcatagcgt tcgtgaaggt gaactggatg caaccgaaca ccatctgctg 6060

caacagctga ttgaagatgc cgatcatagc cgtcgtcaga ccattctggt tctgacccag 6120

attgatcaga ttccggatca gaccatcctg acacagatta aaaccagcat tgcacagcag 6180

gttccgaaac tggatatttg ggcagttagc gcaacccgtc atcgtcaggg cattgaaaac 6240

ggtaaaaccc tgctgatcga aaaaagcggt attggtgcac tgcgccatac cctggaacag 6300

gcactggcac aggtgccgag cgcacgtacc tatgaaaaaa atcgtctgct gtcagatctg 6360

caccatcagc tgaaacaact gctgctggat cagaaacatg ttctgcaaca actgcaacag 6420

acacagcaac agcagctgca tgattttgat accggtctga ttaacattct ggacaaaatt 6480

cgtgttgatc tggaaccgat tgtgaatatt gatggtcagg atcaagcact gaatccggat 6540

agctttgcaa ccatgtttaa aaacaccgca gcaaaacagc agcgtgccaa agttcagatt 6600

gcatatagcc gtgcatgcat tgaaatcaac agccatctga ttcgccatgg tgttgttggt 6660

ctgcctgcgg aacagcagac caccattaaa agcattgata ccgtgattgt tgccgtgttt 6720

ggtatcagcg ttaaatttcg tgatcagctg cgtgccctgt tttataccga taccgaacgt 6780

cagcgtctgc aacgtgaatt tcgtttctat tttgaaaaaa gtgccggtcg catgattctg 6840

gcagcaaaaa ttgaacagac catgcgtcag cagggctgta ttcagaatgc catgatggca 6900

ctgcaacaaa tggaaagcgc agcataaaaa cacggacgcc gcaaacggcg tccgaatttc 6960

ttggtcgacc gttaaatcta tcaccgcaag ggataaatat ctaacaccgt gcgtgttgac 7020

tattttacct ctggcggtga taatggttgc atgtactaat ctagataagg aatatagcca 7080

tgaccgcacc gattcaggat ctgcgtgatg caattgccct gctgcaacag catgataatc 7140

agtatctgga aaccgatcat ccggttgatc cgaatgcaga actggcaggc gtttatcgtc 7200

atattggtgc cggtggcacc gttaaacgtc cgacccgtat tggtccggca atgatgttta 7260

ataacattaa aggttatccg cacagccgta ttctggttgg tatgcatgca agccgtcagc 7320

gtgcagcact gctgctgggt tgtgaagcaa gtcagctggc actggaagtt ggtaaagcag 7380

ttaaaaaacc ggttgcaccg gtggttgttc cggcaagcag cgcaccgtgt caagagcaga 7440

tttttctggc agatgatccg gattttgatc tgcgtaccct gctgcctgca cataccaata 7500

ccccgattga tgcaggtccg ttttttttgtc tgggtctggc cctggcaagc gatccggtgg 7560

atgcaagcct gaccgatgtt accattcatc gtctgtgtgt tcagggtcgt gatgaactga 7620

gcatgttcct ggcagcaggt cgccatattg aagtttttcg tcagaaagca gaagcagcag 7680

gtaaaccgct gccgattacc attaatatgg gtctggaccc agcaatctat attggcgcat 7740

gttttgaagc accgaccacc ccgtttggtt ataatgaact gggtgttgcc ggtgcactgc 7800

gtcagcgtcc ggttgaactg gttcagggtg ttagcgttcc ggaaaaagca attgcacgtg 7860

ccgaaattgt tattgaaggt gaactgctgc ctggtgttcg tgttcgtgaa gatcagcata 7920

ccaattcagg tcatgcaatg ccggaatttc cgggttattg tggtggtgca aatccgagcc 7980

tgccggttat taaagttaaa gccgttacca tgcgcaataa cgcaattctg caaaccctgg 8040

ttggtccggg tgaagaacat accaccctgg caggtctgcc gaccgaagca agcatttgga 8100

atgcagttga agcagcaatt ccgggttttc tgcaaaatgt ttatgcccat accgcaggcg 8160

gtggtaaatt tctgggtatt ctgcaagtga aaaaacgtca gcctgccgat gaaggtcgtc 8220

agggtcaggc agccctgctg gcgctggcaa cctatagcga actgaaaaat atcattctgg 8280

tggatgagga tgtggacatt tttgatagtg atgatattct gtgggcaatg accacccgta 8340

tgcagggtga tgttagcatt accaccattc cgggtattcg cggtcatcag ctggacccga 8400

gccagacacc ggaatattca ccgagcattc gtggtaatgg tattagctgc aaaaccatct 8460

ttgattgtac cgttccgtgg gcactgaaaa gccattttga acgtgcaccg tttgcagatg 8520

ttgatccgcg tccgtttgca cctgaatatt ttgcacgtct ggaaaaaaat cagggcagcg 8580

caaaataagc taataacagg cctgctggta atcgcaggaa tttttatttg gatggatccg 8640

cctacctagc ttccaagaaa gatatcctaa cagcacaaga gcggaaagat gttttgttct 8700

acatccagaa caacctctgc taaaattcct gaaaaatttt gcaaaaagtt gttgacttta 8760

tctacaaggt gtggtataat aatcttaaca acagcaggac gctcccgggt tgaggaaaac 8820

ctaatgccga gcaaactggc aattagcagc atgagcctgg gtcgttgttt tgcaggtcat 8880

agcctggata gtaaactgga tgcagcacag cgttatggtt atctgggtat tgaactgttt 8940

tatgaggatc tggttgatgt tgcagaacat ctgagcaatg aacgtccgag tccggaaggt 9000

ccgtttgttg aagcacagat tgcagcagca cgtcatattc tgcaaatgtg tcaggcacgt 9060

ggtctggaag ttgtttgtct gcaaccgttt atgcattatg atggtctgaa tgatcgtgcc 9120

gaacatgaac gtcgtctgga aaaactggca ctgtggattg aactggcaca tgaactgcat 9180

accgatatta ttcagattcc ggcaaatttt ctgcctgcaa atcaggttag cgataatctg 9240

gatctgattg ttagcgatct gtgtaaagtt gcagatattg gtgcacaggc actgcctccg 9300

attcgttttg catatgaaag cctgtgttgg agcacccgtg ttgatctgtg ggaacgttgt 9360

tgggatattg ttcagcgtgt ggatcgtccg aattttggta tttgtctgga tacctttaac 9420

atcctgggtc gcatttatgc agatccgacc agcccgagcg gtcgtacccc gaatgcaaaa 9480

gaagcagttc gtaaaagcat tgccaatctg gttagccgtg tggatgttag caaagttttt 9540

tatgttcagg ttgtggatgc cgaacgtctg agtaaaccgc tgctgcctgg tcatccgtat 9600

tataacccgg aacagcctgc acgtatgagc tggtcacgta attgtcgtct gttctatggt 9660

gaaaccgaat atggtgcata tctgccggtt aaagaagttg cacgcgcact gtttcatggt 9720

attggttttg aaggttgggt tagcctggaa ctgtttaatc gtcgtatgag cgaagaaggt 9780

ccggaagttc ctgaagaact ggccatgcgt ggtgcaatta gctgggcaaa actggttcag 9840

gatctgcgta ttccggttga aggtccgctg gttaccatgc ctcgtgttag cgcaagcctg 9900

taaatgcatg cgcgccgcgt tcgcgcggcg ctttttttg gtaccgagct cgaattcact 9960

ggccgtcgtt ttacaacgtc gtgactggga aaaccctggc gttacccaac ttaatcgcct 10020

tgcagcacat ccccctttcg ccagctggcg taatagcgaa gaggcccgca ccgatcgccc 10080

ttcccaacag ttgcgcagcc tgaatggcga atggcgcctg atgcggtatt ttctccttac 10140

gcatctgtgc ggtatttcac accgcatatg gtgcactctc agtacaatct gctctgatgc 10200

cgcatagtta agccagcccc gacacccgcc aacacccgct gacgaattc 10249

<210> 28
<211> 7623
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature

<222> (1)..(7623)

<223> DNA sequence of the plasmid pCP32AMP

<400> 28

acatgaatgg tcttcggttt ccgtgtttcg taaagtctgg aaacgcggaa gtcagcgccc 60

tgcaccatta tgttccggat ctgcatcgca ggatgctgct ggctaccctg tggaacacct 120

acatctgtat taacgaagcg ctggcattga ccctgagtga ttttttctctg gtcccgccgc 180

atccataccg ccagttgttt accctcacaa cgttccagta accgggcatg ttcatcatca 240

gtaacccgta tcgtgagcat cctctctcgt ttcatcggta tcattacccc catgaacaga 300

aattcccccct tacacggagg catcaagtga ccaaacagga aaaaaccgcc cttaacatgg 360

cccgctttat cagaagccag acattaacgc ttctggagaa actcaacgag ctggacgcgg 420

atgaacaggc agacatctgt gaatcgcttc acgaccacgc tgatgagctt taccgcagct 480

gcctcgcgcg tttcggtgat gacggtgaaa acctctgaca catgcagctc ccggagacgg 540

tcacagcttg tctgtaagcg gatgccggga gcagacaagc ccgtcagggc gcgtcagcgg 600

gtgttggcgg gtgtcggggc gcagccatga cccagtcacg tagcgatagc ggagtgtata 660

ctggcttaac tatgcggcat cagagcagat tgtactgaga gtgcaccata tgcggtgtga 720

aataccgcac agatgcgtaa ggagaaaata ccgcatcagg cgctcttccg cttcctcgct 780

cactgactcg ctgcgctcgg tcgttcggct gcggcgagcg gtatcagctc actcaaaggc 840

ggtaatacgg ttatccacag aatcagggga taacgcagga aagaacatgt gagcaaaagg 900

ccagcaaaag gccaggaacc gtaaaaaggc cgcgttgctg gcgtttttcc ataggctccg 960

ccccccctgac gagcatcaca aaaatcgacg ctcaagtcag aggtggcgaa acccgacagg 1020

actataaaga taccaggcgt ttcccccctgg aagctccctc gtgcgctctc ctgttccgac 1080

cctgccgctt accggatacc tgtccgcctt tctcccttcg ggaagcgtgg cgctttctca 1140

tagctcacgc tgtaggtatc tcagttcggt gtaggtcgtt cgctccaagc tgggctgtgt 1200

gcacgaaccc cccgttcagc ccgaccgctg cgccttatcc ggtaactatc gtcttgagtc 1260

caacccggta agacacgact tatcgccact ggcagcagcc actggtaaca ggattagcag 1320

agcgaggtat gtaggcggtg ctacagagtt cttgaagtgg tggcctaact acggctacac 1380

tagaaggaca gtatttggta tctgcgctct gctgaagcca gttaccttcg gaaaaagagt 1440

tggtagctct tgatccggca aacaaaccac cgctggtagc ggtggttttt ttgtttgcaa 1500

gcagcagatt acgcgcagaa aaaaaggatc tcaagaagat cctttgatct tttctacggg 1560

gtctgacgct cagtggaacg aaaactcacg ttaagggatt ttggtcatga gattatcaaa 1620

aaggatcttc acctagatcc ttttaaatta aaaatgaagt tttaaatcaa tctaaagtat 1680

atatgagtaa acttggtctg acagttacca atgcttaatc agtgaggcac ctatctcagc 1740

gatctgtcta tttcgttcat ccatagttgc ctgactcccc gtcgtgtaga taactacgat 1800

acgggagggc ttaccatctg gccccagtgc tgcaatgata ccgcgagacc cacgctcacc 1860

ggctccagat ttatcagcaa taaaccagcc agccggaagg gccgagcgca gaagtggtcc 1920

tgcaacttta tccgcctcca tccagtctat taattgttgc cgggaagcta gagtaagtag 1980

ttcgccagtt aatagtttgc gcaacgttgt tgccattgct gcaggcatcg tggtgtcacg 2040

ctcgtcgttt ggtatggctt cattcagctc cggttcccaa cgatcaaggc gagttacatg 2100

atcccccatg ttgtgcaaaa aagcggttag ctccttcggt cctccgatcg ttgtcagaag 2160

taagttggcc gcagtgttat cactcatggt tatggcagca ctgcataatt ctcttactgt 2220

catgccatcc gtaagatgct tttctgtgac tggtgagtac tcaaccaagt cattctgaga 2280

atagtgtatg cggcgaccga gttgctcttg cccggcgtca acacgggata ataccgcgcc 2340

acatagcaga actttaaaag tgctcatcat tggaaaacgt tcttcggggc gaaaactctc 2400

aaggatctta ccgctgttga gatccagttc gatgtaaccc actcgtgcac ccaactgatc 2460

ttcagcatct tttactttca ccagcgtttc tgggtgagca aaaacaggaa ggcaaaatgc 2520

cgcaaaaaag ggaataaggg cgacacggaa atgttgaata ctcatactct tccttttttca 2580

atattattga agcatttatc agggttattg tctcatgagc ggatacatat ttgaatgtat 2640

ttagaaaaat aaacaaatag gggttccgcg cacatttccc cgaaaagtgc cacctgacgt 2700

ctaagaaacc attattatca tgacattaac ctataaaaat aggcgtatca cgaggccctt 2760

tcgtcttcaa gaattctgaa ccagtcctaa aacgagtaaa taggaccggc aattcttcaa 2820

gcaataaaca ggaataccaa ttattaaaag ataacttagt cagatcgtac aataaagctt 2880

tgaagaaaaa tgcgccttat tcaatctttg ctataaaaaa tggcccaaaa tctcacattg 2940

gaagacattt gatgacctca tttctttcaa tgaagggcct aacggagttg actaatgttg 3000

tgggaaattg gagcgataag cgtgcttctg ccgtggccag gacaacgtat actcatcaga 3060

taacagcaat acctgatcac tacttcgcac tagtttctcg gtactatgca tatgatccaa 3120

tatcaaagga aatgatagca ttgaaggatg agactaatcc aattgaggag tggcagcata 3180

tagaacagct aaagggtagt gctgaaggaa gcatacgata ccccgcatgg aatgggataa 3240

tatcacagga ggtactagac tacctttcat cctacataaa tagacgcata taagtacgca 3300

tttaagcata aacacgcact atgccgttct tctcatgtat atatatatac aggcaacacg 3360

cagatatagg tgcgacgtga acagtgagct gtatgtgcgc agctcgcgtt gcattttcgg 3420

aagcgctcgt tttcggaaac gctttgaagt tcctattccg aagttcctat tctctagaaa 3480

gtataggaac ttcagagcgc ttttgaaaac caaaagcgct ctgaagacgc actttcaaaa 3540

aaccaaaaac gcaccggact gtaacgagct actaaaatat tgcgaatacc gcttccacaa 3600

acattgctca aaagtatctc tttgctatat atctctgtgc tatatcccta tataacctac 3660

ccatccacct ttcgctcctt gaacttgcat ctaaactcga cctctacatt ttttatgttt 3720

atctctagta ttactcttta gacaaaaaaa ttgtagtaag aactattcat agagtgaatc 3780

gaaaacaata cgaaaatgta aacatttcct atacgtagta tatagagaca aaatagaaga 3840

aaccgttcat aattttctga ccaatgaaga atcatcaacg ctatcacttt ctgttcacaa 3900

agtatgcgca atccacatcg gtatagaata taatcgggga tgcctttatc ttgaaaaaat 3960

gcacccgcag cttcgctagt aatcagtaaa cgcgggaagt ggagtcaggc ttttttttatg 4020

gaagagaaaa tagacaccaa agtagccttc ttctaacctt aacggaccta cagtgcaaaa 4080

agttatcaag agactgcatt atagagcgca caaaggagaa aaaaagtaat ctaagatgct 4140

ttgttagaaa aatagcgctc tcgggatgca tttttgtaga acaaaaaaga agtatagatt 4200

ctttgttggt aaaatagcgc tctcgcgttg catttctgtt ctgtaaaaat gcagctcaga 4260

ttctttgttt gaaaaattag cgctctcgcg ttgcattttt gttttacaaa aatgaagcac 4320

agattcttcg ttggtaaaat agcgctttcg cgttgcattt ctgttctgta aaaatgcagc 4380

tcagattctt tgtttgaaaa attagcgctc tcgcgttgca tttttgttct acaaaatgaa 4440

gcacagatgc ttcgttaaca aagatatgct attgaagtgc aagatggaaa cgcagaaaat 4500

gaaccgggga tgcgacgtgc aagattacct atgcaataga tgcaatagtt tctccaggaa 4560

ccgaaataca tacattgtct tccgtaaagc gctagactat atattattat acaggttcaa 4620

atatactatc tgtttcaggg aaaactccca ggttcggatg ttcaaaattc aatgatgggt 4680

aacaagtacg atcgtaaatc tgtaaaacag tttgtcggat attaggctgt atctcctcaa 4740

agcgtattcg aatatcattg agaagctgca gcgtcacatc ggataataat gatggcagcc 4800

attgtagaag tgccttttgc atttctagtc tctttctcgg tctagctagt tttactacat 4860

cgcgaagata gaatcttaga tcacactgcc tttgctgagc tggatcaata gagtaacaaa 4920

agagtggtaa ggcctcgtta aaggacaagg acctgagcgg aagtgtatcg tacagtagac 4980

ggagtatact agtatagtct atagtccgtg gaattctcat gtttgacagc ttatcatcga 5040

taagcttttc aattcaattc atcatttttt ttttattctt ttttttgatt tcggtttctt 5100

tgaaattttt ttgattcggt aatctccgaa cagaaggaag aacgaaggaa ggagcacaga 5160

cttagattgg tatatatacg catatgtagt gttgaagaaa catgaaattg cccagtattc 5220

ttaacccaac tgcacagaac aaaaacctgc aggaaacgaa gataaatcat gtcgaaagct 5280

acatataagg aacgtgctgc tactcatcct agtcctgttg ctgccaagct atttaatatc 5340

atgcacgaaa agcaaacaaa cttgtgtgct tcattggatg ttcgtaccac caaggaatta 5400

ctggagttag ttgaagcatt aggtcccaaa atttgtttac taaaaacaca tgtggatatc 5460

ttgactgatt tttccatgga gggcacagtt aagccgctaa aggcattatc cgccaagtac 5520

aatttttac tcttcgaaga cagaaaattt gctgacattg gtaatacagt caaattgcag 5580

tactctgcgg gtgtatacag aatagcagaa tgggcagaca ttacgaatgc acacggtgtg 5640

gtgggcccag gtattgttag cggtttgaag caggcggcag aagaagtaac aaaggaacct 5700

agaggccttt tgatgttagc agaattgtca tgcaagggct ccctatctac tggagaatat 5760

actaagggta ctgttgacat tgcgaagagc gacaaagatt ttgttatcgg ctttattgct 5820

caaagagaca tgggtggaag agatgaaggt tacgattggt tgattatgac acccggtgtg 5880

ggtttagatg acaagggaga cgcattgggt caacagtata gaaccgtgga tgatgtggtc 5940

tctacaggat ctgacattat tattgttgga agaggactat ttgcaaaggg aagggatgct 6000

aaggtagagg gtgaacgtta cagaaaagca ggctgggaag catatttgag aagatgcggc 6060

cagcaaaact aaaaaactgt attataagta aatgcatgta tactaaactc acaaattaga 6120

gcttcaattt aattatatca gttattaccc gggaatctcg gtcgtaatga cttgaaataa 6180

ttaacaaaca aaggagttac agttagaaat tgtaggagag atctcgtttt tcgcgacaat 6240

ctggcgtttt tcttgctaat tccaggatta atccgttcat agtgtaaaac cccgtttaca 6300

cattctgacg gaagatatag attggaagta ttgcattcac taagataagt atggcaacac 6360

tggaacagac atgaattatc agaacgacga tttacgcatc aaagaaatca aagagttact 6420

tcctcctgtc gcattgctgg aaaaattccc cgctactgaa aatgccgcga atacggttgc 6480

ccatgcccga aaagcgatcc ataagatcct gaaaggtaat gatgatcgcc tgttggttgt 6540

gattggccca tgctcaattc atgatcctgt cgcggcaaaa gagtatgcca ctcgcttgct 6600

ggcgctgcgt gaagagctga aagatgagct ggaaatcgta atgcgcgtct attttgaaaa 6660

gccgcgtacc acggtgggct ggaaagggct gattaacgat ccgcatatgg ataatagctt 6720

ccagatcaac gacggtctgc gtatagcccg taaattgctg cttgatatta acgacagcgg 6780

tctgccagcg gcaggtgagt ttctcgatat gatcacccca caatatctcg ctgacctgat 6840

gagctggggc gcaattggcg cacgtaccac cgaatcgcag gtgcaccgcg aactggcatc 6900

agggctttct tgtccggtcg gcttcaaaaa tggcaccgac ggtacgatta aagtggctat 6960

cgatgccatt aatgccgccg gtgcgccgca ctgcttcctg tccgtaacga aatgggggca 7020

ttcggcgatt gtgaatacca gcggtaacgg cgattgccat atcattctgc gcggcggtaa 7080

agagcctaac tacagcgcga agcacgttgc tgaagtgaaa gaagggctga acaaagcagg 7140

cctgccagca caggtgatga tcgatttcag ccatgctaac tcgtccaaac aattcaaaaa 7200

gcagatggat gtttgtgctg acgtttgcca gcagattgcc ggtggcgaaa aggccattat 7260

tggcgtgatg gtggaaagcc atctggtgga aggcaatcag agcctcgaga gcggggagcc 7320

gctggcctac ggtaagagca tcaccgatgc ctgcatcggc tgggaagata ccgatgctct 7380

gttacgtcaa ctggcgaatg cagtaaaagc gcgtcgcggg taaggtttaa ttgtcggatg 7440

cgccgtcaga gtggcgtatc cgatgaatca ccacaggcct gataagtcgc gcagcgtcgc 7500

atcaggcaat gtgctccatt gttagcaaca aaaaagccga ctcacttgca gtcggctttc 7560

tcattttaaa cgaatgacgt ttacttcgct ttaccctggt ttgcaaccgc cgctgctttc 7620

gct 7623

<210> 29
<211> 7630
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(7630)
<223> DNA sequence of the plasmid pCP14

<400> 29
ctcgaggcta ttgacgacag ctatggttca ctgtccacca accaaaactg tgctcagtac 60

cgccaatatt tctcccttga ggggtacaaa gaggtgtccc tagaagagat ccacgctgtg 120

taaaaatttt acaaaaaggt attgactttc cctacagggt gtgtaataat ttaattacag 180

gcgggggcaa ccccgcctgt tctagaggag gaggaatcgc catggagagg attgtcgtta 240

ctctcgggga acgtagttac ccaattacca tcgcatctgg tttgtttaat gaaccagctt 300

cattcttacc gctgaaatcg ggcgagcagg tcatgttggt caccaacgaa accctggctc 360

ctctgtatct cgataaggtc cgcggcgtac ttgaacaggc gggtgttaac gtcgatagcg 420

ttatcctccc tgacggcgag cagtataaaa gcctggctgt actcgatacc gtctttacgg 480

cgttgttaca aaagccgcat ggtcgcgata ctacgctggt ggcgcttggc ggcggcgtag 540

tgggcgatct gaccggcttc gcggcggcga gttatcagcg cggtgttcgt ttcattcaag 600

tcccgacgac gttactgtcg caggtcgatt cctccgttgg cggcaaaact gcggtcaacc 660

atcccctcgg taaaaacatg attggcgcgt tctaccagcc tgcttcagtg gtggtggatc 720

tcgactgtct gaaaacgctt cccccgcgtg agttagcgtc ggggctggca gaagtcatca 780

aatacggcat tattcttgac ggtgcgtttt tcaactggct ggaagagaat ctggatgcgt 840

tgttgcgtct ggacggtccg gcaatggcgt actgtattcg ccgttgttgt gaactgaagg 900

cagaagttgt cgccgccgac gagcgcgaaa ccgggttacg tgctttactg aatctgggac 960

acacctttgg tcatgccatt gaagctgaaa tggggtatgg caattggtta catggtgaag 1020

cggtcgctgc gggtatggtg atggcggcgc ggacgtcgga acgtctcggg cagtttagtt 1080

ctgccgaaac gcagcgtatt ataaccctgc tcacgcgggc tgggttaccg gtcaatgggc 1140

cgcgcgaaat gtccgcgcag gcgtatttac cgcatatgct gcgtgacaag aaagtccttg 1200

cgggagagat gcgcttaatt cttccgttgg caattggtaa gagtgaagtt cgcagcggcg 1260

tttcgcacga gcttgttctt aacgccattg ccgattgtca atcagcgtaa tcatcgttca 1320

tgcctgatgc cgctatgtag gccggataag gcgttcacgc cgcatccggc aaccgatgcc 1380

tgatgcgacg cggtcgcgtc ttatcaggcc tacaggtcga tgccgatatg tacatcgtat 1440

tcggcaatta atacatagca acatgaatgg tcttcggttt ccgtgtttcg taaagtctgg 1500

aaacgcggaa gtcagcgccc tgcaccatta tgttccggat ctgcatcgca ggatgctgct 1560

ggctaccctg tggaacacct acatctgtat taacgaagcg ctggcattga ccctgagtga 1620

tttttctctg gtcccgccgc atccataccg ccagttgttt accctcacaa cgttccagta 1680

accgggcatg ttcatcatca gtaacccgta tcgtgagcat cctctctcgt ttcatcggta 1740

tcattacccc catgaacaga aattcccccc tacacggagg catcaagtga ccaaacagga 1800

aaaaaccgcc cttaacatgg cccgctttat cagaagccag acattaacgc ttctggagaa 1860

actcaacgag ctggacgcgg atgaacaggc agacatctgt gaatcgcttc acgaccacgc 1920

tgatgagctt taccgcagct gcctcgcgcg tttcggtgat gacggtgaaa acctctgaca 1980

catgcagctc ccggagacgg tcacagcttg tctgtaagcg gatgccggga gcagacaagc 2040

ccgtcagggc gcgtcagcgg gtgttggcgg gtgtcggggc gcagccatga cccagtcacg 2100

tagcgatagc ggagtgtata ctggcttaac tatgcggcat cagagcagat tgtactgaga 2160

gtgcaccata tgcggtgtga aataccgcac agatgcgtaa ggagaaaata ccgcatcagg 2220

cgctcttccg cttcctcgct cactgactcg ctgcgctcgg tcgttcggct gcggcgagcg 2280

gtatcagctc actcaaaggc ggtaatacgg ttatccacag aatcagggga taacgcagga 2340

aagaacatgt gagcaaaagg ccagcaaaag gccaggaacc gtaaaaaggc cgcgttgctg 2400

gcgtttttcc ataggctccg ccccccctgac gagcatcaca aaaatcgacg ctcaagtcag 2460

aggtggcgaa acccgacagg actataaaga taccaggcgt ttcccccctgg aagctccctc 2520

gtgcgctctc ctgttccgac cctgccgctt accggatacc tgtccgcctt tctcccttcg 2580

ggaagcgtgg cgctttctca tagctcacgc tgtaggtatc tcagttcggt gtaggtcgtt 2640

cgctccaagc tgggctgtgt gcacgaaccc cccgttcagc ccgaccgctg cgccttatcc 2700

ggtaactatc gtcttgagtc caacccggta agacacgact tatcgccact ggcagcagcc 2760

actggtaaca ggattagcag agcgaggtat gtaggcggtg ctacagagtt cttgaagtgg 2820

tggcctaact acggctacac tagaaggaca gtatttggta tctgcgctct gctgaagcca 2880

gttaccttcg gaaaaagagt tggtagctct tgatccggca aacaaaccac cgctggtagc 2940

ggtggttttt ttgtttgcaa gcagcagatt acgcgcagaa aaaaaggatc tcaagaagat 3000

cctttgatct tttctacggg gtctgacgct cagtggaacg aaaactcacg ttaagggatt 3060

ttggtcatga gattatcaaa aaggatcttc acctagatcc ttttaaatta aaaatgaagt 3120

tttaaatcaa tctaaagtat atatgagtaa acttggtctg acagttacca atgcttaatc 3180

agtgaggcac ctatctcagc gatctgtcta tttcgttcat ccatagttgc ctgactcccc 3240

gtcgtgtaga taactacgat acgggagggc ttaccatctg gccccagtgc tgcaatgata 3300

ccgcgagacc cacgctcacc ggctccagat ttatcagcaa taaaccagcc agccggaagg 3360

gccgagcgca gaagtggtcc tgcaacttta tccgcctcca tccagtctat taattgttgc 3420

cgggaagcta gagtaagtag ttcgccagtt aatagtttgc gcaacgttgt tgccattgct 3480

gcaggcatcg tggtgtcacg ctcgtcgttt ggtatggctt cattcagctc cggttcccaa 3540

cgatcaaggc gagttacatg atcccccatg ttgtgcaaaa aagcggttag ctccttcggt 3600

cctccgatcg ttgtcagaag taagttggcc gcagtgttat cactcatggt tatggcagca 3660

ctgcataatt ctcttactgt catgccatcc gtaagatgct tttctgtgac tggtgagtac 3720

tcaaccaagt cattctgaga atagtgtatg cggcgaccga gttgctcttg cccggcgtca 3780

acacgggata ataccgcgcc acatagcaga actttaaaag tgctcatcat tggaaaacgt 3840

tcttcggggc gaaaactctc aaggatctta ccgctgttga gatccagttc gatgtaaccc 3900

actcgtgcac ccaactgatc ttcagcatct tttactttca ccagcgtttc tgggtgagca 3960

aaaacaggaa ggcaaaatgc cgcaaaaaag ggaataaggg cgacacggaa atgttgaata 4020

ctcatactct tccttttca atattattga agcatttatc agggttattg tctcatgagc 4080

ggatacatat ttgaatgtat ttagaaaaat aaacaaatag gggttccgcg cacatttccc 4140

cgaaaagtgc cacctgacgt ctaagaaacc attattatca tgacattaac ctataaaaat 4200

aggcgtatca cgaggccctt tcgtcttcaa gaattctgaa ccagtcctaa aacgagtaaa 4260

taggaccggc aattcttcaa gcaataaaca ggaataccaa ttattaaaag ataacttagt 4320

cagatcgtac aataaagctt tgaagaaaaa tgcgccttat tcaatctttg ctataaaaaa 4380

tggcccaaaa tctcacattg gaagacattt gatgacctca tttctttcaa tgaagggcct 4440

aacggagttg actaatgttg tgggaaattg gagcgataag cgtgcttctg ccgtggccag 4500

gacaacgtat actcatcaga taacagcaat acctgatcac tacttcgcac tagtttctcg 4560

gtactatgca tatgatccaa tatcaaagga aatgatagca ttgaaggatg agactaatcc 4620

aattgaggag tggcagcata tagaacagct aaagggtagt gctgaaggaa gcatacgata 4680

ccccgcatgg aatgggataa tatcacagga ggtactagac taccttttcat cctacataaa 4740

tagacgcata taagtacgca tttaagcata aacacgcact atgccgttct tctcatgtat 4800

atatatatac aggcaacacg cagatatagg tgcgacgtga acagtgagct gtatgtgcgc 4860

agctcgcgtt gcattttcgg aagcgctcgt tttcggaaac gctttgaagt tcctattccg 4920

aagttcctat tctctagaaa gtataggaac ttcagagcgc ttttgaaaac caaaagcgct 4980

ctgaagacgc actttcaaaa aaccaaaaac gcaccggact gtaacgagct actaaaatat 5040

tgcgaatacc gcttccacaa acattgctca aaagtatctc tttgctatat atctctgtgc 5100

tatatcccta tataacctac ccatccacct ttcgctcctt gaacttgcat ctaaactcga 5160

cctctacatt ttttatgttt atctctagta ttactcttta gacaaaaaaa ttgtagtaag 5220

aactattcat agagtgaatc gaaaacaata cgaaaatgta aacatttcct atacgtagta 5280

tatagagaca aaatagaaga aaccgttcat aattttctga ccaatgaaga atcatcaacg 5340

ctatcacttt ctgttcacaa agtatgcgca atccacatcg gtatagaata taatcgggga 5400

tgcctttatc ttgaaaaaat gcacccgcag cttcgctagt aatcagtaaa cgcgggaagt 5460

ggagtcaggc tttttttatg gaagagaaaa tagacaccaa agtagccttc ttctaacctt 5520

aacggaccta cagtgcaaaa agttatcaag agactgcatt atagagcgca caaaggagaa 5580

aaaaagtaat ctaagatgct ttgttagaaa aatagcgctc tcgggatgca tttttgtaga 5640

acaaaaaaga agtatagatt ctttgttggt aaaatagcgc tctcgcgttg catttctgtt 5700

ctgtaaaaat gcagctcaga ttctttgttt gaaaaattag cgctctcgcg ttgcatttttt 5760

gttttacaaa aatgaagcac agattcttcg ttggtaaaat agcgctttcg cgttgcattt 5820

ctgttctgta aaaatgcagc tcagattctt tgtttgaaaa attagcgctc tcgcgttgca 5880

tttttgttct acaaaatgaa gcacagatgc ttcgttaaca aagatatgct attgaagtgc 5940

aagatggaaa cgcagaaaat gaaccgggga tgcgacgtgc aagattacct atgcaataga 6000

tgcaatagtt tctccaggaa ccgaaataca tacattgtct tccgtaaagc gctagactat 6060

atattattat acaggttcaa atatactatc tgtttcaggg aaaactccca ggttcggatg 6120

ttcaaaattc aatgatgggt aacaagtacg atcgtaaatc tgtaaaacag tttgtcggat 6180

attaggctgt atctcctcaa agcgtattcg aatatcattg agaagctgca gcgtcacatc 6240

ggataataat gatggcagcc attgtagaag tgccttttgc atttctagtc tctttctcgg 6300

tctagctagt tttactacat cgcgaagata gaatcttaga tcacactgcc tttgctgagc 6360

tggatcaata gagtaacaaa agagtggtaa ggcctcgtta aaggacaagg acctgagcgg 6420

aagtgtatcg tacagtagac ggagtatact agtatagtct atagtccgtg gaattctcat 6480

gtttgacagc ttatcatcga taagcttttc aattcaattc atcatttttt ttttattctt 6540

ttttttgatt tcggtttctt tgaaattttt ttgattcggt aatctccgaa cagaaggaag 6600

aacgaaggaa ggagcacaga cttagattgg tatatatacg catatgtagt gttgaagaaa 6660

catgaaattg cccagtattc ttaacccaac tgcacagaac aaaaacctgc aggaaacgaa 6720

gataaatcat gtcgaaagct acatataagg aacgtgctgc tactcatcct agtcctgttg 6780

ctgccaagct atttaatatc atgcacgaaa agcaaacaaa cttgtgtgct tcattggatg 6840

ttcgtaccac caaggaatta ctggagttag ttgaagcatt aggtcccaaa atttgtttac 6900

taaaaacaca tgtggatatc ttgactgatt tttccatgga gggcacagtt aagccgctaa 6960

aggcattatc cgccaagtac aatttttac tcttcgaaga cagaaaattt gctgacattg 7020

gtaatacagt caaattgcag tactctgcgg gtgtatacag aatagcagaa tgggcagaca 7080

ttacgaatgc acacggtgtg gtgggcccag gtattgttag cggtttgaag caggcggcag 7140

aagaagtaac aaaggaacct agaggccttt tgatgttagc agaattgtca tgcaagggct 7200

ccctatctac tggagaatat actaagggta ctgttgacat tgcgaagagc gacaaagatt 7260

ttgttatcgg ctttattgct caaagagaca tgggtggaag agatgaaggt tacgattggt 7320

tgattatgac acccggtgtg ggtttagatg acaagggaga cgcattgggt caacagtata 7380

gaaccgtgga tgatgtggtc tctacaggat ctgacattat tattgttgga agaggactat 7440

ttgcaaaggg aagggatgct aaggtagagg gtgaacgtta cagaaaagca ggctgggaag 7500

catatttgag aagatgcggc cagcaaaact aaaaaactgt attataagta aatgcatgta 7560

tactaaactc acaaattaga gcttcaattt aattatatca gttattaccc gggaatctcg 7620

gtcgtaatga 7630

<210> 30

<211> 10015

<212> DNA

<213> Escherichia coli

<220>

<221> misc_feature

<222> (1)..(10015)

<223> DNA sequence of the plasmid pCP50

<400> 30

cttgaaataa ttaacaaaca aaggagttac agttagaaat tgtaggagag atctcgtttt 60

tcgcgacaat ctggcgtttt tcttgctaat tccaggatta atccgttcat agtgtaaaac 120

cccgtttaca cattctgacg gaagatatag attggaagta ttgcattcac taagataagt 180

atggcaacac tggaacagac atgaattatc agaacgacga tttacgcatc aaagaaatca 240

aagagttact tcctcctgtc gcattgctgg aaaaattccc cgctactgaa aatgccgcga 300

atacggttgc ccatgcccga aaagcgatcc ataagatcct gaaaggtaat gatgatcgcc 360

tgttggttgt gattggccca tgctcaattc atgatcctgt cgcggcaaaa gagtatgcca 420

ctcgcttgct ggcgctgcgt gaagagctga aagatgagct ggaaatcgta atgcgcgtct 480

attttgaaaa gccgcgtacc acggtgggct ggaaagggct gattaacgat ccgcatatgg 540

ataatagctt ccagatcaac gacggtctgc gtatagcccg taaattgctg cttgatatta 600

acgacagcgg tctgccagcg gcaggtgagt ttctcgatat gatcacccca caatatctcg 660

ctgacctgat gagctggggc gcaattggcg cacgtaccac cgaatcgcag gtgcaccgcg 720

aactggcatc agggctttct tgtccggtcg gcttcaaaaa tggcaccgac ggtacgatta 780

aagtggctat cgatgccatt aatgccgccg gtgcgccgca ctgcttcctg tccgtaacga 840

aatgggggca ttcggcgatt gtgaatacca gcggtaacgg cgattgccat atcattctgc 900

gcggcggtaa agagcctaac tacagcgcga agcacgttgc tgaagtgaaa gaagggctga 960

acaaagcagg cctgccagca caggtgatga tcgatttcag ccatgctaac tcgtccaaac 1020

aattcaaaaa gcagatggat gtttgtgctg acgtttgcca gcagattgcc ggtggcgaaa 1080

aggccattat tggcgtgatg gtggaaagcc atctggtgga aggcaatcag agcctcgaga 1140

gcggggagcc gctggcctac ggtaagagca tcaccgatgc ctgcatcggc tgggaagata 1200

ccgatgctct gttacgtcaa ctggcgaatg cagtaaaagc gcgtcgcggg taaggtttaa 1260

ttgtcggatg cgccgtcaga gtggcgtatc cgatgaatca ccacaggcct gataagtcgc 1320

gcagcgtcgc atcaggcaat gtgctccatt gttagcaaca aaaaagccga ctcacttgca 1380

gtcggctttc tcattttaaa cgaatgacgt ttacttcgct ttaccctggt ttgcaaccgc 1440

cgctgctttc gctacatgaa tggtcttcgg tttccgtgtt tcgtaaagtc tggaaacgcg 1500

gaagtcagcg ccctgcacca ttatgttccg gatctgcatc gcaggatgct gctggctacc 1560

ctgtggaaca cctacatctg tattaacgaa gcgctggcat tgaccctgag tgatttttct 1620

ctggtcccgc cgcatccata ccgccagttg tttaccctca caacgttcca gtaaccgggc 1680

atgttcatca tcagtaaccc gtatcgtgag catcctctct cgtttcatcg gtatcattac 1740

ccccatgaac agaaattccc ccttacacgg aggcatcaag tgaccaaaca ggaaaaaacc 1800

gcccttaaca tggcccgctt tatcagaagc cagacattaa cgcttctgga gaaactcaac 1860

gagctggacg cggatgaaca ggcagacatc tgtgaatcgc ttcacgacca cgctgatgag 1920

ctttaccgca gctgcctcgc gcgtttcggt gatgacggtg aaaacctctg acacatgcag 1980

ctcccggaga cggtcacagc ttgtctgtaa gcggatgccg ggagcagaca agcccgtcag 2040

ggcgcgtcag cgggtgttgg cgggtgtcgg ggcgcagcca tgacccagtc acgtagcgat 2100

agcggagtgt atactggctt aactatgcgg catcagagca gattgtactg agagtgcacc 2160

atatgcggtg tgaaataccg cacagatgcg taaggagaaa ataccgcatc aggcgctctt 2220

ccgcttcctc gctcactgac tcgctgcgct cggtcgttcg gctgcggcga gcggtatcag 2280

ctcactcaaa ggcggtaata cggttatcca cagaatcagg ggataacgca ggaaagaaca 2340

tgtgagcaaa aggccagcaa aaggccagga accgtaaaaa ggccgcgttg ctggcgtttt 2400

tccataggct ccgccccccct gacgagcatc acaaaaatcg acgctcaagt cagaggtggc 2460

gaaacccgac aggactataa agataccagg cgtttccccc tggaagctcc ctcgtgcgct 2520

ctcctgttcc gaccctgccg cttaccggat acctgtccgc ctttctccct tcgggaagcg 2580

tggcgctttc tcatagctca cgctgtaggt atctcagttc ggtgtaggtc gttcgctcca 2640

agctgggctg tgtgcacgaa ccccccgttc agcccgaccg ctgcgcctta tccggtaact 2700

atcgtcttga gtccaacccg gtaagacacg acttatcgcc actggcagca gccactggta 2760

acaggattag cagagcgagg tatgtaggcg gtgctacaga gttcttgaag tggtggccta 2820

actacggcta cactagaagg acagtatttg gtatctgcgc tctgctgaag ccagttacct 2880

tcggaaaaag agttggtagc tcttgatccg gcaaacaaac caccgctggt agcggtggtt 2940

tttttgtttg caagcagcag attacgcgca gaaaaaaagg atctcaagaa gatcctttga 3000

tcttttctac ggggtctgac gctcagtgga acgaaaactc acgttaaggg attttggtca 3060

tgagattatc aaaaaggatc ttcacctaga tccttttaaa ttaaaaatga agttttaaat 3120

caatctaaag tatatatgag taaacttggt ctgacagtta ccaatgctta atcagtgagg 3180

cacctatctc agcgatctgt ctatttcgtt catccatagt tgcctgactc cccgtcgtgt 3240

agataactac gatacgggag ggcttaccat ctggccccag tgctgcaatg ataccgcgag 3300

acccacgctc accggctcca gatttatcag caataaacca gccagccgga agggccgagc 3360

gcagaagtgg tcctgcaact ttatccgcct ccatccagtc tattaattgt tgccgggaag 3420

ctagagtaag tagttcgcca gttaatagtt tgcgcaacgt tgttgccatt gctgcaggca 3480

tcgtggtgtc acgctcgtcg tttggtatgg cttcattcag ctccggttcc caacgatcaa 3540

ggcgagttac atgatccccc atgttgtgca aaaaagcggt tagctccttc ggtcctccga 3600

tcgttgtcag aagtaagttg gccgcagtgt tatcactcat ggttatggca gcactgcata 3660

attctcttac tgtcatgcca tccgtaagat gcttttctgt gactggtgag tactcaacca 3720

agtcattctg agaatagtgt atgcggcgac cgagttgctc ttgcccggcg tcaacacggg 3780

ataataccgc gccacatagc agaactttaa aagtgctcat cattggaaaa cgttcttcgg 3840

ggcgaaaact ctcaaggatc ttaccgctgt tgagatccag ttcgatgtaa cccactcgtg 3900

cacccaactg atcttcagca tcttttactt tcaccagcgt ttctgggtga gcaaaaacag 3960

gaaggcaaaa tgccgcaaaa aagggaataa gggcgacacg gaaatgttga atactcatac 4020

tcttccttt tcaatattat tgaagcattt atcagggtta ttgtctcatg agcggataca 4080

tatttgaatg tatttagaaa aataaacaaa taggggttcc gcgcacattt ccccgaaaag 4140

tgccacctga cgtctaagaa accattatta tcatgacatt aacctataaa aataggcgta 4200

tcacgaggcc ctttcgtctt caagaattct gaaccagtcc taaaacgagt aaataggacc 4260

ggcaattctt caagcaataa acaggaatac caattattaa aagataactt agtcagatcg 4320

tacaataaag ctttgaagaa aaatgcgcct tattcaatct ttgctataaa aaatggccca 4380

aaatctcaca ttggaagaca tttgatgacc tcatttcttt caatgaaggg cctaacggag 4440

ttgactaatg ttgtgggaaa ttggagcgat aagcgtgctt ctgccgtggc caggacaacg 4500

tatactcatc agataacagc aatacctgat cactacttcg cactagtttc tcggtactat 4560

gcatatgatc caatatcaaa ggaaatgata gcattgaagg atgagactaa tccaattgag 4620

gagtggcagc atatagaaca gctaaagggt agtgctgaag gaagcatacg ataccccgca 4680

tggaatggga taatatcaca ggaggtacta gactaccttt catcctacat aaatagacgc 4740

atataagtac gcatttaagc ataaacacgc actatgccgt tcttctcatg tatatatata 4800

tacaggcaac acgcagatat aggtgcgacg tgaacagtga gctgtatgtg cgcagctcgc 4860

gttgcatttt cggaagcgct cgttttcgga aacgctttga agttcctatt ccgaagttcc 4920

tattctctag aaagtatagg aacttcagag cgcttttgaa aaccaaaagc gctctgaaga 4980

cgcactttca aaaaaccaaa aacgcaccgg actgtaacga gctactaaaa tattgcgaat 5040

accgcttcca caaacattgc tcaaaagtat ctctttgcta tatatctctg tgctatatcc 5100

ctatataacc tacccatcca cctttcgctc cttgaacttg catctaaact cgacctctac 5160

attttttatg tttatctcta gtattactct ttagacaaaa aaattgtagt aagaactatt 5220

catagagtga atcgaaaaca atacgaaaat gtaaacattt cctatacgta gtatatagag 5280

acaaaataga agaaaccgtt cataattttc tgaccaatga agaatcatca acgctatcac 5340

tttctgttca caaagtatgc gcaatccaca tcggtataga atataatcgg ggatgccttt 5400

atcttgaaaa aatgcacccg cagcttcgct agtaatcagt aaacgcggga agtggagtca 5460

ggctttttt atggaagaga aaatagacac caaagtagcc ttcttctaac cttaacggac 5520

ctacagtgca aaaagttatc aagagactgc attatagagc gcacaaagga gaaaaaaagt 5580

aatctaagat gctttgttag aaaaatagcg ctctcgggat gcatttttgt agaacaaaaa 5640

agaagtatag attctttgtt ggtaaaatag cgctctcgcg ttgcatttct gttctgtaaa 5700

aatgcagctc agattctttg tttgaaaaat tagcgctctc gcgttgcatt tttgttttac 5760

aaaaatgaag cacagattct tcgttggtaa aatagcgctt tcgcgttgca tttctgttct 5820

gtaaaaatgc agctcagatt ctttgtttga aaaattagcg ctctcgcgtt gcatttttgt 5880

tctacaaaat gaagcacaga tgcttcgtta acaaagatat gctattgaag tgcaagatgg 5940

aaacgcagaa aatgaaccgg ggatgcgacg tgcaagatta cctatgcaat agatgcaata 6000

gtttctccag gaaccgaaat acatacattg tcttccgtaa agcgctagac tatatattat 6060

tatacaggtt caaatatact atctgtttca gggaaaactc ccaggttcgg atgttcaaaa 6120

ttcaatgatg ggtaacaagt acgatcgtaa atctgtaaaa cagtttgtcg gatattaggc 6180

tgtatctcct caaagcgtat tcgaatatca ttgagaagct gcagcgtcac atcggataat 6240

aatgatggca gccattgtag aagtgccttt tgcatttcta gtctctttct cggtctagct 6300

agttttacta catcgcgaag atagaatctt agatcacact gcctttgctg agctggatca 6360

atagagtaac aaaagagtgg taaggcctcg ttaaaggaca aggacctgag cggaagtgta 6420

tcgtacagta gacggagtat actagtatag tctatagtcc gtggaattct catgtttgac 6480

agcttatcat cgataagctt ttcaattcaa ttcatcattt ttttttatt cttttttttg 6540

atttcggttt ctttgaaatt tttttgattc ggtaatctcc gaacagaagg aagaacgaag 6600

gaaggagcac agacttagat tggtatatat acgcatatgt agtgttgaag aaacatgaaa 6660

ttgcccagta ttcttaaccc aactgcacag aacaaaaacc tgcaggaaac gaagataaat 6720

catgtcgaaa gctacatata aggaacgtgc tgctactcat cctagtcctg ttgctgccaa 6780

gctatttaat atcatgcacg aaaagcaaac aaacttgtgt gcttcattgg atgttcgtac 6840

caccaaggaa ttactggagt tagttgaagc attaggtccc aaaatttgtt tactaaaaac 6900

acatgtggat atcttgactg atttttccat ggagggcaca gttaagccgc taaaggcatt 6960

atccgccaag tacaattttt tactcttcga agacagaaaa tttgctgaca ttggtaatac 7020

agtcaaattg cagtactctg cgggtgtata cagaatagca gaatgggcag acattacgaa 7080

tgcacacggt gtggtgggcc caggtattgt tagcggtttg aagcaggcgg cagaagaagt 7140

aacaaaggaa cctagaggcc ttttgatgtt agcagaattg tcatgcaagg gctccctatc 7200

tactggagaa tatactaagg gtactgttga cattgcgaag agcgacaaag attttgttat 7260

cggctttatt gctcaaagag acatgggtgg aagagatgaa ggttacgatt ggttgattat 7320

gacacccggt gtgggtttag atgacaaggg agacgcattg ggtcaacagt atagaaccgt 7380

ggatgatgtg gtctctacag gatctgacat tattattgtt ggaagaggac tatttgcaaa 7440

gggaagggat gctaaggtag agggtgaacg ttacagaaaa gcaggctggg aagcatattt 7500

gagaagatgc ggccagcaaa actaaaaaac tgtattataa gtaaatgcat gtatactaaa 7560

ctcacaaatt agagcttcaa tttaattata tcagttatta cccgggaatc tcggtcgtaa 7620

tgaaaggaaa agcgcaacgg acgggcgagt agattgcgca acatgcgagc atgatccaga 7680

gatttctgaa gcagcaaaag gatgttccat gtacatgacg cgcggcttgc ggtaaattgt 7740

tggcaaattt tccggcgtag cccaaaacgc gctgtcgtca agtcgttaag ggcgtgccct 7800

tcatcatccg atctggagtc aaaatgtcct cacgtaaaga gcttgccaat gctattcgtg 7860

cgctgagcat ggacgcagta cagaaagcca aatccggtca cccgggtgcc cctatgggta 7920

tggctgacat tgccgaagtc ctgtggcgtg atttcctgaa acacaacccg cagaatccgt 7980

cctgggctga ccgtgaccgc ttcgtgctgt ccaacggcca cggctccatg ctgatctaca 8040

gcctgctgca cctcaccggt tacgatctgc cgatggaaga actgaaaaac ttccgtcagc 8100

tgcactctaa aactccgggc cacccggaag taggttatac cgctggtgtg gaaaccacca 8160

ccggtccgct gggtcagggt attgccaacg cagtcggtat ggcgattgca gaaaaaacgc 8220

tggcggcgca gtttaaccgt ccaggtcacg acattgtcga ccactacacc tacgccttca 8280

tgggcgacgg ctgcatgatg gaaggcatct cccacgaagt ttgctctctg gcgggtacgc 8340

tgaagctggg taaactgatt gcgttctacg atgacaacgg tatctcaatc gatggtcacg 8400

ttgaaggctg gttcactgac gacaccgcaa tgcgtttcga agcttacggc tggcacgtta 8460

ttcgcgacat cgacggtcat gacgcggcat ccatcaaacg cgcagtagaa gaagcgcgcg 8520

cagtgactga caaaccgtcc ctgctgatgt gcaaaaccat catcggtttc ggttccccga 8580

acaaagccgg tacccacgac tcccacggtg cgccgctggg cgacgctgaa attgccctga 8640

cccgcgaaca gctgggctgg aaatacgcgc cgttcgaaat cccgtctgaa atctatgctc 8700

agtgggatgc gaaagaagca ggccaggcga aagaatctgc atggaatgag aagtttgcgg 8760

cttacgcgaa agcttatccg caggaagcgg ctgaatttac ccgccgtatg aaaggcgaaa 8820

tgccgtctga cttcgacgcc aaagcgaaag agtttatcgc taaactgcag gctaatccgg 8880

cgaaaatcgc cagccgtaaa gcgtcgcaga atgctatcga agcgttcggc ccgctgttgc 8940

ctgaattcct cggcggctct gctgacctgg caccgtctaa cctgaccctg tggtctggtt 9000

ctaaagcaat caacgaagat gctgcaggta actacatcca ctacggtgtt cgcgagttcg 9060

gtatgaccgc gattgctaac ggtatctccc tgcacggtgg tttcctgccg tacacctcca 9120

ccttcctgat gttcgtggaa tacgcacgta acgccgtacg tatggctgcg ctgatgaaac 9180

agcgtcaggt gatggtttac acccacgact ccatcggtct gggcgaagat ggcccgactc 9240

accagccggt tgagcaggtc gcttctctgc gcgtgacccc gaacatgtct acatggcgtc 9300

cgtgtgacca ggttgaatcc gcggtcgcgt ggaaatacgg cgttgagcgt caggacggcc 9360

cgactgcgct tatcctctcc cgtcagaacc tggcgcagca ggaacgaact gaagagcaac 9420

tggcaaacat cgcgcgcggt ggttatgtgc tgaaagactg cgccggtcag ccggaactga 9480

ttttcatcgc taccggttca gaagttgaac tggctgttgc tgcctacgaa aaactgactg 9540

ccgaaggcgt gaaagcgcgc gtggtgtcca tgccgtctac cgacgcattt gacaagcagg 9600

atgctgctta ccgtgaatcc gtactgccga aagcggttac tgcacgcgtt gctgtagaag 9660

cgggtattgc tgactactgg tacaagtatg ttggcctgaa cggtgctatc gtcggtatga 9720

ccaccttcgg tgaatctgct ccggcagagc tgctgtttga agagttcggc ttcactgttg 9780

ataacgttgt tgcgaaagca aaagaactgc tgtaattagc atttcgggta aaaaggtcgc 9840

ttcggcgacc ttttttatta ccttgatatg tccgtttgcg gacaagcaat agataaagcg 9900

tgttgtagat cacaaatatt tatatgcaat aaatatcaat tatgtaatat gcatcacgat 9960

atgcgtattg acatttgttg ttataactat aactcaatgt tatataagaa attaa 10015

<210> 31
<211> 9065
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(9065)
<223> DNA sequence of the plasmid pCP54

<400> 31
acatgaatgg tcttcggttt ccgtgtttcg taaagtctgg aaacgcggaa gtcagcgccc 60

tgcaccatta tgttccggat ctgcatcgca ggatgctgct ggctaccctg tggaacacct 120

acatctgtat taacgaagcg ctggcattga ccctgagtga tttttctctg gtcccgccgc 180

atccataccg ccagttgttt accctcacaa cgttccagta accgggcatg ttcatcatca 240

gtaacccgta tcgtgagcat cctctctcgt ttcatcggta tcattacccc catgaacaga 300

aattcccct tacacggagg catcaagtga ccaaacagga aaaaaccgcc cttaacatgg 360

cccgctttat cagaagccag acattaacgc ttctggagaa actcaacgag ctggacgcgg 420

atgaacaggc agacatctgt gaatcgcttc acgaccacgc tgatgagctt taccgcagct 480

gcctcgcgcg tttcggtgat gacggtgaaa acctctgaca catgcagctc ccggagacgg 540

tcacagcttg tctgtaagcg gatgccggga gcagacaagc ccgtcagggc gcgtcagcgg 600

gtgttggcgg gtgtcggggc gcagccatga cccagtcacg tagcgatagc ggagtgtata 660

ctggcttaac tatgcggcat cagagcagat tgtactgaga gtgcaccata tgcggtgtga 720

aataccgcac agatgcgtaa ggagaaaata ccgcatcagg cgctcttccg cttcctcgct 780

cactgactcg ctgcgctcgg tcgttcggct gcggcgagcg gtatcagctc actcaaaggc 840

ggtaatacgg ttatccacag aatcagggga taacgcagga aagaacatgt gagcaaaagg 900

ccagcaaaag gccaggaacc gtaaaaaggc cgcgttgctg gcgtttttcc ataggctccg 960

ccccccctgac gagcatcaca aaaatcgacg ctcaagtcag aggtggcgaa acccgacagg 1020

actataaaga taccaggcgt ttcccccctgg aagctccctc gtgcgctctc ctgttccgac 1080

cctgccgctt accggatacc tgtccgcctt tctcccttcg ggaagcgtgg cgctttctca 1140

tagctcacgc tgtaggtatc tcagttcggt gtaggtcgtt cgctccaagc tgggctgtgt 1200

gcacgaaccc cccgttcagc ccgaccgctg cgccttatcc ggtaactatc gtcttgagtc 1260

caacccggta agacacgact tatcgccact ggcagcagcc actggtaaca ggattagcag 1320

agcgaggtat gtaggcggtg ctacagagtt cttgaagtgg tggcctaact acggctacac 1380

tagaaggaca gtatttggta tctgcgctct gctgaagcca gttaccttcg gaaaaagagt 1440

tggtagctct tgatccggca aacaaaccac cgctggtagc ggtggttttt ttgtttgcaa 1500

gcagcagatt acgcgcagaa aaaaaggatc tcaagaagat cctttgatct tttctacggg 1560

gtctgacgct cagtggaacg aaaactcacg ttaagggatt ttggtcatga gattatcaaa 1620

aaggatcttc acctagatcc ttttaaatta aaaatgaagt tttaaatcaa tctaaagtat 1680

atatgagtaa acttggtctg agtggcggtt ttcatggctt gttatgactg tttttttggg 1740

gtacagtcta tgcctcgggc atccaagcag caagcgcgtt acgccgtggg tcgatgtttg 1800

atgttatgga gcagcaacga tgttacgcag cagggcagtc gccctaaaac aaagttaaac 1860

atcatgaggg aagcggtgat cgccgaagta tcgactcaac tatcagaggt agttggcgtc 1920

atcgagcgcc atctcgaacc gacgttgctg gccgtacatt tgtacggctc cgcagtggat 1980

ggcggcctga agccacacag tgatattgat ttgctggtta cggtgaccgt aaggcttgat 2040

gaaacaacgc ggcgagcttt gatcaacgac cttttggaaa cttcggcttc ccctggagag 2100

agcgagattc tccgcgctgt agaagtcacc attgttgtgc acgacgacat cattccgtgg 2160

cgttatccag ctaagcgcga actgcaattt ggagaatggc agcgcaatga cattcttgca 2220

ggtatcttcg agccagccac gatcgacatt gatctggcta tcttgctgac aaaagcaaga 2280

gaacatagcg ttgccttggt aggtccagcg gcggaggaac tctttgatcc ggttcctgaa 2340

caggatctat ttgaggcgct aaatgaaacc ttaacgctat ggaactcgcc gcccgactgg 2400

gctggcgatg agcgaaatgt agtgcttacg ttgtcccgca tttggtacag cgcagtaacc 2460

ggcaaaatcg cgccgaagga tgtcgctgcc gactgggcaa tggagcgcct gccggcccag 2520

tatcagcccg tcatacttga agctagacag gcttatcttg gacaagaaga agatcgcttg 2580

gcctcgcgcg cagatcagtt ggaagaattt gtccactacg tgaaaggcga gatcaccaag 2640

gtagtcggca aataatgtct aacaattcgt tcaagccgac gccgcttcgc ggcgcggctt 2700

aactcaagcg ttagatgcac taagcacata attgctcaca gccaaactat cagaattctg 2760

aaccagtcct aaaacgagta ataggaccg gcaattcttc aagcaataaa caggaatacc 2820

aattattaaa agataactta gtcagatcgt acaataaagc tttgaagaaa aatgcgcctt 2880

attcaatctt tgctataaaa aatggcccaa aatctcacat tggaagacat ttgatgacct 2940

catttctttc aatgaagggc ctaacggagt tgactaatgt tgtgggaaat tggagcgata 3000

agcgtgcttc tgccgtggcc aggacaacgt atactcatca gataacagca atacctgatc 3060

actacttcgc actagtttct cggtactatg catatgatcc aatatcaaag gaaatgatag 3120

cattgaagga tgagactaat ccaattgagg agtggcagca tatagaacag ctaaagggta 3180

gtgctgaagg aagcatacga taccccgcat ggaatgggat aatatcacag gaggtactag 3240

actacctttc atcctacata aatagacgca tataagtacg catttaagca taaacacgca 3300

ctatgccgtt cttctcatgt atatatatat acaggcaaca cgcagatata ggtgcgacgt 3360

gaacagtgag ctgtatgtgc gcagctcgcg ttgcattttc ggaagcgctc gttttcggaa 3420

acgctttgaa gttcctattc cgaagttcct attctctaga aagtatagga acttcagagc 3480

gcttttgaaa accaaaagcg ctctgaagac gcactttcaa aaaaccaaaa acgcaccgga 3540

ctgtaacgag ctactaaaat attgcgaata ccgcttccac aaacattgct caaaagtatc 3600

tctttgctat atatctctgt gctatatccc tatataacct acccatccac ctttcgctcc 3660

ttgaacttgc atctaaactc gacctctaca ttttttatgt ttatctctag tattactctt 3720

tagacaaaaa aattgtagta agaactattc atagagtgaa tcgaaaacaa tacgaaaatg 3780

taaacatttc ctatacgtag tatatagaga caaaatagaa gaaaccgttc ataattttct 3840

gaccaatgaa gaatcatcaa cgctatcact ttctgttcac aaagtatgcg caatccacat 3900

cggtatagaa tataatcggg gatgccttta tcttgaaaaa atgcacccgc agcttcgcta 3960

gtaatcagta aacgcgggaa gtggagtcag gctttttta tggaagagaa aatagacacc 4020

aaagtagcct tcttctaacc ttaacggacc tacagtgcaa aaagttatca agagactgca 4080

ttatagagcg cacaaaggag aaaaaaagta atctaagatg ctttgttaga aaaatagcgc 4140

tctcgggatg cattttgta gaacaaaaaa gaagtataga ttctttgttg gtaaaatagc 4200

gctctcgcgt tgcatttctg ttctgtaaaa atgcagctca gattctttgt ttgaaaaatt 4260

agcgctctcg cgttgcattt ttgttttaca aaaatgaagc acagattctt cgttggtaaa 4320

atagcgcttt cgcgttgcat ttctgttctg taaaaatgca gctcagattc tttgtttgaa 4380

aaattagcgc tctcgcgttg cattttgtt ctacaaaatg aagcacagat gcttcgttaa 4440

caaagatatg ctattgaagt gcaagatgga aacgcagaaa atgaaccggg gatgcgacgt 4500

gcaagattac ctatgcaata gatgcaatag tttctccagg aaccgaaata catacattgt 4560

cttccgtaaa gcgctagact atatattatt atacaggttc aaatatacta tctgtttcag 4620

ggaaaactcc caggttcgga tgttcaaaat tcaatgatgg gtaacaagta cgatcgtaaa 4680

tctgtaaaac agtttgtcgg atattaggct gtatctcctc aaagcgtatt cgaatatcat 4740

tgagaagctg cagcgtcaca tcggataata atgatggcag ccattgtaga agtgcctttt 4800

gcatttctag tctctttctc ggtctagcta gttttactac atcgcgaaga tagaatctta 4860

gatcacactg cctttgctga gctggatcaa tagagtaaca aaagagtggt aaggcctcgt 4920

taaaggacaa ggacctgagc ggaagtgtat cgtacagtag acggagtata ctagtatagt 4980

ctatagtccg tggaattctc atgtttgaca gcttatcatc gataagcttt tcaattcaat 5040

tcatcatttt ttttttattc tttttttga tttcggtttc tttgaaattt ttttgattcg 5100

gtaatctccg aacagaagga agaacgaagg aaggagcaca gacttagatt ggtatatata 5160

cgcatatgta gtgttgaaga aacatgaaat tgcccagtat tcttaaccca actgcacaga 5220

acaaaaacct gcaggaaacg aagataaatc atgtcgaaag ctacatataa ggaacgtgct 5280

gctactcatc ctagtcctgt tgctgccaag ctatttaata tcatgcacga aaagcaaaca 5340

aacttgtgtg cttcattgga tgttcgtacc accaaggaat tactggagtt agttgaagca 5400

ttaggtccca aaatttgttt actaaaaaca catgtggata tcttgactga tttttccatg 5460

gagggcacag ttaagccgct aaaggcatta tccgccaagt acaatttttt actcttcgaa 5520

gacagaaaat ttgctgacat tggtaataca gtcaaattgc agtactctgc gggtgtatac 5580

agaatagcag aatgggcaga cattacgaat gcacacggtg tggtgggccc aggtattgtt 5640

agcggtttga agcaggcggc agaagaagta acaaaggaac ctagaggcct tttgatgtta 5700

gcagaattgt catgcaaggg ctccctatct actggagaat atactaaggg tactgttgac 5760

attgcgaaga gcgacaaaga ttttgttatc ggctttattg ctcaaagaga catgggtgga 5820

agagatgaag gttacgattg gttgattatg acacccggtg tgggtttaga tgacaaggga 5880

gacgcattgg gtcaacagta tagaaccgtg gatgatgtgg tctctacagg atctgacatt 5940

attattgttg gaagaggact atttgcaaag ggaagggatg ctaaggtaga gggtgaacgt 6000

tacagaaaag caggctggga agcatatttg agaagatgcg gccagcaaaa ctaaaaaact 6060

gtattataag taaatgcatg tatactaaac tcacaaatta gagcttcaat ttaattatat 6120

cagttattac ccgggaatct cggtcgtaat gacttgaaat aattaacaaa caaaggagtt 6180

acagttagaa attgtaggag agatctcgtt tttcgcgaca atctggcgtt tttcttgcta 6240

attccaggat taatccgttc atagtgtaaa accccgttta cacattctga cggaagatat 6300

agattggaag tattgcattc actaagataa gtatggcaac actggaacag acatgaatta 6360

tcagaacgac gatttacgca tcaaagaaat caaagagtta cttcctcctg tcgcattgct 6420

ggaaaaattc cccgctactg aaaatgccgc gaatacggtt gcccatgccc gaaaagcgat 6480

ccataagatc ctgaaaggta atgatgatcg cctgttggtt gtgattggcc catgctcaat 6540

tcatgatcct gtcgcggcaa aagagtatgc cactcgcttg ctggcgctgc gtgaagagct 6600

gaaagatgag ctggaaatcg taatgcgcgt ctattttgaa aagccgcgta ccacggtggg 6660

ctggaaaggg ctgattaacg atccgcatat ggataatagc ttccagatca acgacggtct 6720

gcgtatagcc cgtaaattgc tgcttgatat taacgacagc ggtctgccag cggcaggtga 6780

gtttctcgat atgatcaccc cacaatatct cgctgacctg atgagctggg gcgcaattgg 6840

cgcacgtacc accgaatcgc aggtgcaccg cgaactggca tcagggcttt cttgtccggt 6900

cggcttcaaa aatggcaccg acggtacgat taaagtggct atcgatgcca ttaatgccgc 6960

cggtgcgccg cactgcttcc tgtccgtaac gaaatggggg cattcggcga ttgtgaatac 7020

cagcggtaac ggcgattgcc atatcattct gcgcggcggt aaagagccta actacagcgc 7080

gaagcacgtt gctgaagtga aagaagggct gaacaaagca ggcctgccag cacaggtgat 7140

gatcgatttc agccatgcta actcgtccaa acaattcaaa aagcagatgg atgtttgtgc 7200

tgacgtttgc cagcagattg ccggtggcga aaaggccatt attggcgtga tggtggaaag 7260

ccatctggtg gaaggcaatc agagcctcga gagcggggag ccgctggcct acggtaagag 7320

catcaccgat gcctgcatcg gctgggaaga taccgatgct ctgttacgtc aactggcgaa 7380

tgcagtaaaa gcgcgtcgcg ggtaaggttt aattgtcgga tgcgccgtca gagtggcgta 7440

tccgatgaat caccacaggc ctgataagtc gcgcagcgtc gcatcaggca atgtgctcca 7500

ttgttagcaa caaaaaagcc gactcacttg cagtcggctt tctcatttta aacgaatgac 7560

gtttacttcg ctttaccctg gtttgcaacc gccgctgctt tcgctctcga ggctattgac 7620

gacagctatg gttcactgtc caccaaccaa aactgtgctc agtaccgcca atatttctcc 7680

cttgaggggt acaaagaggt gtccctagaa gagatccacg ctgtgtaaaa attttacaaa 7740

aaggtattga ctttccctac agggtgtgta ataatttaat tacaggcggg ggcaaccccg 7800

cctgttctag aggaggagga atcgccatgg agaggattgt cgttactctc ggggaacgta 7860

gttacccaat taccatcgca tctggtttgt ttaatgaacc agcttcattc ttaccgctga 7920

aatcgggcga gcaggtcatg ttggtcacca acgaaaccct ggctcctctg tatctcgata 7980

aggtccgcgg cgtacttgaa caggcgggtg ttaacgtcga tagcgttatc ctccctgacg 8040

gcgagcagta taaaagcctg gctgtactcg ataccgtctt tacggcgttg ttacaaaagc 8100

cgcatggtcg cgatactacg ctggtggcgc ttggcggcgg cgtagtgggc gatctgaccg 8160

gcttcgcggc ggcgagttat cagcgcggtg ttcgtttcat tcaagtcccg acgacgttac 8220

tgtcgcaggt cgattcctcc gttggcggca aaactgcggt caaccatccc ctcggtaaaa 8280

acatgattgg cgcgttctac cagcctgctt cagtggtggt ggatctcgac tgtctgaaaa 8340

cgcttccccc gcgtgagtta gcgtcggggc tggcagaagt catcaaatac ggcattattc 8400

ttgacggtgc gtttttcaac tggctggaag agaatctgga tgcgttgttg cgtctggacg 8460

gtccggcaat ggcgtactgt attcgccgtt gttgtgaact gaaggcagaa gttgtcgccg 8520

ccgacgagcg cgaaaccggg ttacgtgctt tactgaatct gggacacacc tttggtcatg 8580

ccattgaagc tgaaatgggg tatggcaatt ggttacatgg tgaagcggtc gctgcgggta 8640

tggtgatggc ggcgcggacg tcggaacgtc tcgggcagtt tagttctgcc gaaacgcagc 8700

gtattataac cctgctcacg cgggctgggt taccggtcaa tgggccgcgc gaaatgtccg 8760

cgcaggcgta tttaccgcat atgctgcgtg acaagaaagt ccttgcggga gagatgcgct 8820

taattcttcc gttggcaatt ggtaagagtg aagttcgcag cggcgtttcg cacgagcttg 8880

ttcttaacgc cattgccgat tgtcaatcag cgtaatcatc gttcatgcct gatgccgcta 8940

tgtaggccgg ataaggcgtt cacgccgcat ccggcaaccg atgcctgatg cgacgcggtc 9000

gcgtcttatc aggcctacag gtcgatgccg atatgtacat cgtattcggc aattaataca 9060

tagca 9065

<210> 32
<211> 11475
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(11475)
<223> DNA sequence of the plasmid pCP55

<400> 32
acatgaatgg tcttcggttt ccgtgtttcg taaagtctgg aaacgcggaa gtcagcgccc 60

tgcaccatta tgttccggat ctgcatcgca ggatgctgct ggctaccctg tggaacacct 120

acatctgtat taacgaagcg ctggcattga ccctgagtga ttttttctctg gtcccgccgc 180

atccataccg ccagttgttt accctcacaa cgttccagta accgggcatg ttcatcatca 240

gtaacccgta tcgtgagcat cctctctcgt ttcatcggta tcattacccc catgaacaga 300

aattcccccct tacacggagg catcaagtga ccaaacagga aaaaaccgcc cttaacatgg 360

cccgctttat cagaagccag acattaacgc ttctggagaa actcaacgag ctggacgcgg 420

atgaacaggc agacatctgt gaatcgcttc acgaccacgc tgatgagctt taccgcagct 480

gcctcgcgcg tttcggtgat gacggtgaaa acctctgaca catgcagctc ccggagacgg 540

tcacagcttg tctgtaagcg gatgccggga gcagacaagc ccgtcagggc gcgtcagcgg 600

gtgttggcgg gtgtcggggc gcagccatga cccagtcacg tagcgatagc ggagtgtata 660

ctggcttaac tatgcggcat cagagcagat tgtactgaga gtgcaccata tgcggtgtga 720

aataccgcac agatgcgtaa ggagaaaata ccgcatcagg cgctcttccg cttcctcgct 780

cactgactcg ctgcgctcgg tcgttcggct gcggcgagcg gtatcagctc actcaaaggc 840

ggtaatacgg ttatccacag aatcagggga taacgcagga aagaacatgt gagcaaaagg 900

ccagcaaaag gccaggaacc gtaaaaaggc cgcgttgctg gcgtttttcc ataggctccg 960

ccccccctgac gagcatcaca aaaatcgacg ctcaagtcag aggtggcgaa acccgacagg 1020

actataaaga taccaggcgt ttccccctgg aagctccctc gtgcgctctc ctgttccgac 1080

cctgccgctt accggatacc tgtccgcctt tctcccttcg ggaagcgtgg cgctttctca 1140

tagctcacgc tgtaggtatc tcagttcggt gtaggtcgtt cgctccaagc tgggctgtgt 1200

gcacgaaccc cccgttcagc ccgaccgctg cgccttatcc ggtaactatc gtcttgagtc 1260

caacccggta agacacgact tatcgccact ggcagcagcc actggtaaca ggattagcag 1320

agcgaggtat gtaggcggtg ctacagagtt cttgaagtgg tggcctaact acggctacac 1380

tagaaggaca gtatttggta tctgcgctct gctgaagcca gttaccttcg gaaaaagagt 1440

tggtagctct tgatccggca aacaaaccac cgctggtagc ggtggttttt ttgtttgcaa 1500

gcagcagatt acgcgcagaa aaaaaggatc tcaagaagat cctttgatct tttctacggg 1560

gtctgacgct cagtggaacg aaaactcacg ttaagggatt ttggtcatga gattatcaaa 1620

aaggatcttc acctagatcc ttttaaatta aaaatgaagt tttaaatcaa tctaaagtat 1680

atatgagtaa acttggtctg acagttacca atgcttaatc agtgaggcac ctatctcagc 1740

gatctgtcta tttcgttcat ccatagttgc ctgactcccc gtcgtgtaga taactacgat 1800

acgggagggc ttaccatctg gccccagtgc tgcaatgata ccgcgagacc cacgctcacc 1860

ggctccagat ttatcagcaa taaaccagcc agccggaagg gccgagcgca gaagtggtcc 1920

tgcaacttta tccgcctcca tccagtctat taattgttgc cgggaagcta gagtaagtag 1980

ttcgccagtt aatagtttgc gcaacgttgt tgccattgct gcaggcatcg tggtgtcacg 2040

ctcgtcgttt ggtatggctt cattcagctc cggttcccaa cgatcaaggc gagttacatg 2100

atcccccatg ttgtgcaaaa aagcggttag ctccttcggt cctccgatcg ttgtcagaag 2160

taagttggcc gcagtgttat cactcatggt tatggcagca ctgcataatt ctcttactgt 2220

catgccatcc gtaagatgct tttctgtgac tggtgagtac tcaaccaagt cattctgaga 2280

atagtgtatg cggcgaccga gttgctcttg cccggcgtca acacgggata ataccgcgcc 2340

acatagcaga actttaaaag tgctcatcat tggaaaacgt tcttcggggc gaaaactctc 2400

aaggatctta ccgctgttga gatccagttc gatgtaaccc actcgtgcac ccaactgatc 2460

ttcagcatct tttactttca ccagcgtttc tgggtgagca aaaacaggaa ggcaaaatgc 2520

cgcaaaaaag ggaataaggg cgacacggaa atgttgaata ctcatactct tccttttca 2580

atattattga agcatttatc agggttattg tctcatgagc ggatacatat ttgaatgtat 2640

ttagaaaaat aaacaaatag gggttccgcg cacatttccc cgaaaagtgc cacctgacgt 2700

ctaagaaacc attattatca tgacattaac ctataaaaat aggcgtatca cgaggccctt 2760

tcgtcttcaa gaattctgaa ccagtcctaa aacgagtaaa taggaccggc aattcttcaa 2820

gcaataaaca ggaataccaa ttattaaaag ataacttagt cagatcgtac aataaagctt 2880

tgaagaaaaa tgcgccttat tcaatctttg ctataaaaaa tggcccaaaa tctcacattg 2940

gaagacattt gatgacctca tttctttcaa tgaagggcct aacggagttg actaatgttg 3000

tgggaaattg gagcgataag cgtgcttctg ccgtggccag gacaacgtat actcatcaga 3060

taacagcaat acctgatcac tacttcgcac tagtttctcg gtactatgca tatgatccaa 3120

tatcaaagga aatgatagca ttgaaggatg agactaatcc aattgaggag tggcagcata 3180

tagaacagct aaagggtagt gctgaaggaa gcatacgata ccccgcatgg aatgggataa 3240

tatcacagga ggtactagac tacctttcat cctacataaa tagacgcata taagtacgca 3300

tttaagcata aacacgcact atgccgttct tctcatgtat atatatatac aggcaacacg 3360

cagatatagg tgcgacgtga acagtgagct gtatgtgcgc agctcgcgtt gcattttcgg 3420

aagcgctcgt tttcggaaac gctttgaagt tcctattccg aagttcctat tctctagaaa 3480

gtataggaac ttcagagcgc ttttgaaaac caaaagcgct ctgaagacgc actttcaaaa 3540

aaccaaaaac gcaccggact gtaacgagct actaaaatat tgcgaatacc gcttccacaa 3600

acattgctca aaagtatctc tttgctatat atctctgtgc tatatcccta tataacctac 3660

ccatccacct ttcgctcctt gaacttgcat ctaaactcga cctctacatt ttttatgttt 3720

atctctagta ttactcttta gacaaaaaaa ttgtagtaag aactattcat agagtgaatc 3780

gaaaacaata cgaaaatgta aacatttcct atacgtagta tatagagaca aaatagaaga 3840

aaccgttcat aattttctga ccaatgaaga atcatcaacg ctatcacttt ctgttcacaa 3900

agtatgcgca atccacatcg gtatagaata taatcgggga tgcctttatc ttgaaaaaat 3960

gcacccgcag cttcgctagt aatcagtaaa cgcgggaagt ggagtcaggc ttttttttatg 4020

gaagagaaaa tagacaccaa agtagccttc ttctaacctt aacggaccta cagtgcaaaa 4080

agttatcaag agactgcatt atagagcgca caaaggagaa aaaaagtaat ctaagatgct 4140

ttgttagaaa aatagcgctc tcgggatgca tttttgtaga acaaaaaaga agtatagatt 4200

ctttgttggt aaaatagcgc tctcgcgttg catttctgtt ctgtaaaaat gcagctcaga 4260

ttctttgttt gaaaaattag cgctctcgcg ttgcattttt gttttacaaa aatgaagcac 4320

agattcttcg ttggtaaaat agcgctttcg cgttgcattt ctgttctgta aaaatgcagc 4380

tcagattctt tgtttgaaaa attagcgctc tcgcgttgca tttttgttct acaaaatgaa 4440

gcacagatgc ttcgttaaca aagatatgct attgaagtgc aagatggaaa cgcagaaaat 4500

gaaccgggga tgcgacgtgc aagattacct atgcaataga tgcaatagtt tctccaggaa 4560

ccgaaataca tacattgtct tccgtaaagc gctagactat atattattat acaggttcaa 4620

atatactatc tgtttcaggg aaaactccca ggttcggatg ttcaaaattc aatgatgggt 4680

aacaagtacg atcgtaaatc tgtaaaacag tttgtcggat attaggctgt atctcctcaa 4740

agcgtattcg aatatcattg agaagctgca gcgtcacatc ggataataat gatggcagcc 4800

attgtagaag tgccttttgc atttctagtc tctttctcgg tctagctagt tttactacat 4860

cgcgaagata gaatcttaga tcacactgcc tttgctgagc tggatcaata gagtaacaaa 4920

agagtggtaa ggcctcgtta aaggacaagg acctgagcgg aagtgtatcg tacagtagac 4980

ggagtatact agtatagtct atagtccgtg gaattctcat gtttgacagc ttatcatcga 5040

taagcttttc aattcaattc atcatttttt ttttattctt ttttttgatt tcggtttctt 5100

tgaaattttt ttgattcggt aatctccgaa cagaaggaag aacgaaggaa ggagcacaga 5160

cttagattgg tatatatacg catatgtagt gttgaagaaa catgaaattg cccagtattc 5220

ttaacccaac tgcacagaac aaaaacctgc aggaaacgaa gataaatcat gtcgaaagct 5280

acatataagg aacgtgctgc tactcatcct agtcctgttg ctgccaagct atttaatatc 5340

atgcacgaaa agcaaacaaa cttgtgtgct tcattggatg ttcgtaccac caaggaatta 5400

ctggagttag ttgaagcatt aggtcccaaa atttgtttac taaaaacaca tgtggatatc 5460

ttgactgatt tttccatgga gggcacagtt aagccgctaa aggcattatc cgccaagtac 5520

aatttttac tcttcgaaga cagaaaattt gctgacattg gtaatacagt caaattgcag 5580

tactctgcgg gtgtatacag aatagcagaa tgggcagaca ttacgaatgc acacggtgtg 5640

gtgggcccag gtattgttag cggtttgaag caggcggcag aagaagtaac aaaggaacct 5700

agaggccttt tgatgttagc agaattgtca tgcaagggct ccctatctac tggagaatat 5760

actaagggta ctgttgacat tgcgaagagc gacaaagatt ttgttatcgg ctttattgct 5820

caaagagaca tgggtggaag agatgaaggt tacgattggt tgattatgac acccggtgtg 5880

ggtttagatg acaagggaga cgcattgggt caacagtata gaaccgtgga tgatgtggtc 5940

tctacaggat ctgacattat tattgttgga agaggactat ttgcaaaggg aagggatgct 6000

aaggtagagg gtgaacgtta cagaaaagca ggctgggaag catatttgag aagatgcggc 6060

cagcaaaact aaaaaactgt attataagta aatgcatgta tactaaactc acaaattaga 6120

gcttcaattt aattatatca gttattaccc gggaatctcg gtcgtaatga aaggaaaagc 6180

gcaacggacg ggcgagtaga ttgcgcaaca tgcgagcatg atccagagat ttctgaagca 6240

gcaaaaggat gttccatgta catgacgcgc ggcttgcggt aaattgttgg caaattttcc 6300

ggcgtagccc aaaacgcgct gtcgtcaagt cgttaagggc gtgcccttca tcatccgatc 6360

tggagtcaaa atgtcctcac gtaaagagct tgccaatgct attcgtgcgc tgagcatgga 6420

cgcagtacag aaagccaaat ccggtcaccc gggtgcccct atgggtatgg ctgacattgc 6480

cgaagtcctg tggcgtgatt tcctgaaaca caacccgcag aatccgtcct gggctgaccg 6540

tgaccgcttc gtgctgtcca acggccacgg ctccatgctg atctacagcc tgctgcacct 6600

caccggttac gatctgccga tggaagaact gaaaaacttc cgtcagctgc actctaaaac 6660

tccgggccac ccggaagtag gttataccgc tggtgtggaa accaccaccg gtccgctggg 6720

tcagggtatt gccaacgcag tcggtatggc gattgcagaa aaaacgctgg cggcgcagtt 6780

taaccgtcca ggtcacgaca ttgtcgacca ctacacctac gccttcatgg gcgacggctg 6840

catgatggaa ggcatctccc acgaagtttg ctctctggcg ggtacgctga agctgggtaa 6900

actgattgcg ttctacgatg acaacggtat ctcaatcgat ggtcacgttg aaggctggtt 6960

cactgacgac accgcaatgc gtttcgaagc ttacggctgg cacgttattc gcgacatcga 7020

cggtcatgac gcggcatcca tcaaacgcgc agtagaagaa gcgcgcgcag tgactgacaa 7080

accgtccctg ctgatgtgca aaaccatcat cggtttcggt tccccgaaca aagccggtac 7140

ccacgactcc cacggtgcgc cgctgggcga cgctgaaatt gccctgaccc gcgaacagct 7200

gggctggaaa tacgcgccgt tcgaaatccc gtctgaaatc tatgctcagt gggatgcgaa 7260

agaagcaggc caggcgaaag aatctgcatg gaatgagaag tttgcggctt acgcgaaagc 7320

ttatccgcag gaagcggctg aatttacccg ccgtatgaaa ggcgaaatgc cgtctgactt 7380

cgacgccaaa gcgaaagagt ttatcgctaa actgcaggct aatccggcga aaatcgccag 7440

ccgtaaagcg tcgcagaatg ctatcgaagc gttcggcccg ctgttgcctg aattcctcgg 7500

cggctctgct gacctggcac cgtctaacct gaccctgtgg tctggttcta aagcaatcaa 7560

cgaagatgct gcaggtaact acatccacta cggtgttcgc gagttcggta tgaccgcgat 7620

tgctaacggt atctccctgc acggtggttt cctgccgtac acctccacct tcctgatgtt 7680

cgtggaatac gcacgtaacg ccgtacgtat ggctgcgctg atgaaacagc gtcaggtgat 7740

ggtttacacc cacgactcca tcggtctggg cgaagatggc ccgactcacc agccggttga 7800

gcaggtcgct tctctgcgcg tgaccccgaa catgtctaca tggcgtccgt gtgaccaggt 7860

tgaatccgcg gtcgcgtgga aatacggcgt tgagcgtcag gacggcccga ctgcgcttat 7920

cctctcccgt cagaacctgg cgcagcagga acgaactgaa gagcaactgg caaacatcgc 7980

gcgcggtggt tatgtgctga aagactgcgc cggtcagccg gaactgattt tcatcgctac 8040

cggttcagaa gttgaactgg ctgttgctgc ctacgaaaaa ctgactgccg aaggcgtgaa 8100

agcgcgcgtg gtgtccatgc cgtctaccga cgcatttgac aagcaggatg ctgcttaccg 8160

tgaatccgta ctgccgaaag cggttactgc acgcgttgct gtagaagcgg gtattgctga 8220

ctactggtac aagtatgttg gcctgaacgg tgctatcgtc ggtatgacca ccttcggtga 8280

atctgctccg gcagagctgc tgtttgaaga gttcggcttc actgttgata acgttgttgc 8340

gaaagcaaaa gaactgctgt aattagcatt tcgggtaaaa aggtcgcttc ggcgaccttt 8400

tttattacct tgatatgtcc gtttgcggac aagcaataga taaagcgtgt tgtagatcac 8460

aaatatttat atgcaataaa tatcaattat gtaatatgca tcacgatatg cgtattgaca 8520

tttgttgtta taactataac tcaatgttat ataagaaatt aacttgaaat aattaacaaa 8580

caaaggagtt acagttagaa attgtaggag agatctcgtt tttcgcgaca atctggcgtt 8640

tttcttgcta attccaggat taatccgttc atagtgtaaa accccgttta cacattctga 8700

cggaagatat agattggaag tattgcattc actaagataa gtatggcaac actggaacag 8760

acatgaatta tcagaacgac gatttacgca tcaaagaaat caaagagtta cttcctcctg 8820

tcgcattgct ggaaaaattc cccgctactg aaaatgccgc gaatacggtt gcccatgccc 8880

gaaaagcgat ccataagatc ctgaaaggta atgatgatcg cctgttggtt gtgattggcc 8940

catgctcaat tcatgatcct gtcgcggcaa aagagtatgc cactcgcttg ctggcgctgc 9000

gtgaagagct gaaagatgag ctggaaatcg taatgcgcgt ctattttgaa aagccgcgta 9060

ccacggtggg ctggaaaggg ctgattaacg atccgcatat ggataatagc ttccagatca 9120

acgacggtct gcgtatagcc cgtaaattgc tgcttgatat taacgacagc ggtctgccag 9180

cggcaggtga gtttctcgat atgatcaccc cacaatatct cgctgacctg atgagctggg 9240

gcgcaattgg cgcacgtacc accgaatcgc aggtgcaccg cgaactggca tcagggcttt 9300

cttgtccggt cggcttcaaa aatggcaccg acggtacgat taaagtggct atcgatgcca 9360

ttaatgccgc cggtgcgccg cactgcttcc tgtccgtaac gaaatggggg cattcggcga 9420

ttgtgaatac cagcggtaac ggcgattgcc atatcattct gcgcggcggt aaagagccta 9480

actacagcgc gaagcacgtt gctgaagtga aagaagggct gaacaaagca ggcctgccag 9540

cacaggtgat gatcgatttc agccatgcta actcgtccaa acaattcaaa aagcagatgg 9600

atgtttgtgc tgacgtttgc cagcagattg ccggtggcga aaaggccatt attggcgtga 9660

tggtggaaag ccatctggtg gaaggcaatc agagcctcga gagcggggag ccgctggcct 9720

acggtaagag catcaccgat gcctgcatcg gctgggaaga taccgatgct ctgttacgtc 9780

aactggcgaa tgcagtaaaa gcgcgtcgcg ggtaaggttt aattgtcgga tgcgccgtca 9840

gagtggcgta tccgatgaat caccacaggc ctgataagtc gcgcagcgtc gcatcaggca 9900

atgtgctcca ttgttagcaa caaaaaagcc gactcacttg cagtcggctt tctcatttta 9960

aacgaatgac gtttacttcg ctttaccctg gtttgcaacc gccgctgctt tcgctctcga 10020

ggctattgac gacagctatg gttcactgtc caccaaccaa aactgtgctc agtaccgcca 10080

atatttctcc cttgaggggt acaaagaggt gtccctagaa gagatccacg ctgtgtaaaa 10140

attttacaaa aaggtattga ctttccctac agggtgtgta ataatttaat tacaggcggg 10200

ggcaaccccg cctgttctag aggaggagga atcgccatgg agaggattgt cgttactctc 10260

ggggaacgta gttacccaat taccatcgca tctggtttgt ttaatgaacc agcttcattc 10320

ttaccgctga aatcgggcga gcaggtcatg ttggtcacca acgaaaccct ggctcctctg 10380

tatctcgata aggtccgcgg cgtacttgaa caggcgggtg ttaacgtcga tagcgttatc 10440

ctccctgacg gcgagcagta taaaagcctg gctgtactcg ataccgtctt tacggcgttg 10500

ttacaaaagc cgcatggtcg cgatactacg ctggtggcgc ttggcggcgg cgtagtgggc 10560

gatctgaccg gcttcgcggc ggcgagttat cagcgcggtg ttcgtttcat tcaagtcccg 10620

acgacgttac tgtcgcaggt cgattcctcc gttggcggca aaactgcggt caaccatccc 10680

ctcggtaaaa acatgattgg cgcgttctac cagcctgctt cagtggtggt ggatctcgac 10740

tgtctgaaaa cgcttccccc gcgtgagtta gcgtcggggc tggcagaagt catcaaatac 10800

ggcattattc ttgacggtgc gtttttcaac tggctggaag agaatctgga tgcgttgttg 10860

cgtctggacg gtccggcaat ggcgtactgt attcgccgtt gttgtgaact gaaggcagaa 10920

gttgtcgccg ccgacgagcg cgaaaccggg ttacgtgctt tactgaatct gggacacacc 10980

tttggtcatg ccattgaagc tgaaatgggg tatggcaatt ggttacatgg tgaagcggtc 11040

gctgcgggta tggtgatggc ggcgcggacg tcggaacgtc tcgggcagtt tagttctgcc 11100

gaaacgcagc gtattataac cctgctcacg cgggctgggt taccggtcaa tgggccgcgc 11160

gaaatgtccg cgcaggcgta tttaccgcat atgctgcgtg acaagaaagt ccttgcggga 11220

gagatgcgct taattcttcc gttggcaatt ggtaagagtg aagttcgcag cggcgtttcg 11280

cacgagcttg ttcttaacgc cattgccgat tgtcaatcag cgtaatcatc gttcatgcct 11340

gatgccgcta tgtaggccgg ataaggcgtt cacgccgcat ccggcaaccg atgcctgatg 11400

cgacgcggtc gcgtcttatc aggcctacag gtcgatgccg atatgtacat cgtattcggc 11460

aattaataca tagca 11475

<210> 33
<211> 7769
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(7769)
<223> DNA sequence of the plasmid YEP24

<400> 33
gaattctgaa ccagtcctaa aacgagtaaa taggaccggc aattcttcaa gcaataaaca 60

ggaataccaa ttattaaaag ataacttagt cagatcgtac aataaagctt tgaagaaaaa 120

tgcgccttat tcaatctttg ctataaaaaa tggcccaaaa tctcacattg gaagacattt 180

gatgacctca tttctttcaa tgaagggcct aacggagttg actaatgttg tgggaaattg 240

gagcgataag cgtgcttctg ccgtggccag gacaacgtat actcatcaga taacagcaat 300

acctgatcac tacttcgcac tagtttctcg gtactatgca tatgatccaa tatcaaagga 360

aatgatagca ttgaaggatg agactaatcc aattgaggag tggcagcata tagaacagct 420

aaagggtagt gctgaaggaa gcatacgata ccccgcatgg aatgggataa tatcacagga 480

ggtactagac tacctttcat cctacataaa tagacgcata taagtacgca tttaagcata 540

aacacgcact atgccgttct tctcatgtat atatatatac aggcaacacg cagatatagg 600

tgcgacgtga acagtgagct gtatgtgcgc agctcgcgtt gcattttcgg aagcgctcgt 660

tttcggaaac gctttgaagt tcctattccg aagttcctat tctctagaaa gtataggaac 720

ttcagagcgc ttttgaaaac caaaagcgct ctgaagacgc actttcaaaa aaccaaaaac 780

gcaccggact gtaacgagct actaaaatat tgcgaatacc gcttccacaa acattgctca 840

aaagtatctc tttgctatat atctctgtgc tatatcccta tataacctac ccatccacct 900

ttcgctcctt gaacttgcat ctaaactcga cctctacatt ttttatgttt atctctagta 960

ttactcttta gacaaaaaaa ttgtagtaag aactattcat agagtgaatc gaaaacaata 1020

cgaaaatgta aacatttcct atacgtagta tatagagaca aaatagaaga aaccgttcat 1080

aattttctga ccaatgaaga atcatcaacg ctatcacttt ctgttcacaa agtatgcgca 1140

atccacatcg gtatagaata taatcgggga tgcctttatc ttgaaaaaat gcacccgcag 1200

cttcgctagt aatcagtaaa cgcgggaagt ggagtcaggc ttttttatg gaagagaaaa 1260

tagacaccaa agtagccttc ttctaacctt aacggaccta cagtgcaaaa agttatcaag 1320

agactgcatt atagagcgca caaaggagaa aaaaagtaat ctaagatgct ttgttagaaa 1380

aatagcgctc tcgggatgca tttttgtaga acaaaaaaga agtatagatt ctttgttggt 1440

aaaatagcgc tctcgcgttg catttctgtt ctgtaaaaat gcagctcaga ttctttgttt 1500

gaaaaattag cgctctcgcg ttgcattttt gttttacaaa aatgaagcac agattcttcg 1560

ttggtaaaat agcgctttcg cgttgcattt ctgttctgta aaaatgcagc tcagattctt 1620

tgtttgaaaa attagcgctc tcgcgttgca tttttgttct acaaaatgaa gcacagatgc 1680

ttcgttaaca aagatatgct attgaagtgc aagatggaaa cgcagaaaat gaaccgggga 1740

tgcgacgtgc aagattacct atgcaataga tgcaatagtt tctccaggaa ccgaaataca 1800

tacattgtct tccgtaaagc gctagactat atattattat acaggttcaa atatactatc 1860

tgtttcaggg aaaactccca ggttcggatg ttcaaaattc aatgatgggt aacaagtacg 1920

atcgtaaatc tgtaaaacag tttgtcggat attaggctgt atctcctcaa agcgtattcg 1980

aatatcattg agaagctgca gcgtcacatc ggataataat gatggcagcc attgtagaag 2040

tgccttttgc atttctagtc tctttctcgg tctagctagt tttactacat cgcgaagata 2100

gaatcttaga tcacactgcc tttgctgagc tggatcaata gagtaacaaa agagtggtaa 2160

ggcctcgtta aaggacaagg acctgagcgg aagtgtatcg tacagtagac ggagtatact 2220

agtatagtct atagtccgtg gaattctcat gtttgacagc ttatcatcga taagcttttc 2280

aattcaattc atcatttttt ttttattctt ttttttgatt tcggtttctt tgaaattttt 2340

ttgattcggt aatctccgaa cagaaggaag aacgaaggaa ggagcacaga cttagattgg 2400

tatatatacg catatgtagt gttgaagaaa catgaaattg cccagtattc ttaacccaac 2460

tgcacagaac aaaaacctgc aggaaacgaa gataaatcat gtcgaaagct acatataagg 2520

aacgtgctgc tactcatcct agtcctgttg ctgccaagct atttaatatc atgcacgaaa 2580

agcaaacaaa cttgtgtgct tcattggatg ttcgtaccac caaggaatta ctggagttag 2640

ttgaagcatt aggtcccaaa atttgtttac taaaaacaca tgtggatatc ttgactgatt 2700

tttccatgga gggcacagtt aagccgctaa aggcattatc cgccaagtac aatttttttac 2760

tcttcgaaga cagaaaattt gctgacattg gtaatacagt caaattgcag tactctgcgg 2820

gtgtatacag aatagcagaa tgggcagaca ttacgaatgc acacggtgtg gtgggcccag 2880

gtattgttag cggtttgaag caggcggcag aagaagtaac aaaggaacct agaggccttt 2940

tgatgttagc agaattgtca tgcaagggct ccctatctac tggagaatat actaagggta 3000

ctgttgacat tgcgaagagc gacaaagatt ttgttatcgg ctttattgct caaagagaca 3060

tgggtggaag agatgaaggt tacgattggt tgattatgac acccggtgtg ggtttagatg 3120

acaagggaga cgcattgggt caacagtata gaaccgtgga tgatgtggtc tctacaggat 3180

ctgacattat tattgttgga agaggactat ttgcaaaggg aagggatgct aaggtagagg 3240

gtgaacgtta cagaaaagca ggctgggaag catatttgag aagatgcggc cagcaaaact 3300

aaaaaactgt attataagta aatgcatgta tactaaactc acaaattaga gcttcaattt 3360

aattatatca gttattaccc gggaatctcg gtcgtaatga tttttataat gacgaaaaaa 3420

aaaaaattgg aaagaaaaag ctttaatgcg gtagtttatc acagttaaat tgctaacgca 3480

gtcaggcacc gtgtatgaaa tctaacaatg cgctcatcgt catcctcggc accgtcaccc 3540

tggatgctgt aggcataggc ttggttatgc cggtactgcc gggcctcttg cgggatatcg 3600

tccattccga cagcatcgcc agtcactatg gcgtgctgct agcgctatat gcgttgatgc 3660

aatttctatg cgcacccgtt ctcggagcac tgtccgaccg ctttggccgc cgcccagtcc 3720

tgctcgcttc gctacttgga gccactatcg actacgcgat catggcgacc acacccgtcc 3780

tgtggatcct ctacgccgga cgcatcgtgg ccggcatcac cggcgccaca ggtgcggttg 3840

ctggcgccta tatcgccgac atcaccgatg gggaagatcg ggctcgccac ttcgggctca 3900

tgagcgcttg tttcggcgtg ggtatggtgg caggccccgt ggccggggga ctgttgggcg 3960

ccatctcctt gcatgcacca ttccttgcgg cggcggtgct caacggcctc aacctactac 4020

tgggctgctt cctaatgcag gagtcgcata agggagagcg tcgaccgatg cccttgagag 4080

ccttcaaccc agtcagctcc ttccggtggg cgcggggcat gactatcgtc gccgcactta 4140

tgactgtctt ctttatcatg caactcgtag gacaggtgcc ggcagcgctc tgggtcattt 4200

tcggcgagga ccgctttcgc tggagcgcga cgatgatcgg cctgtcgctt gcggtattcg 4260

gaatcttgca cgccctcgct caagccttcg tcactggtcc cgccaccaaa cgtttcggcg 4320

agaagcaggc cattatcgcc ggcatggcgg ccgacgcgct gggctacgtc ttgctggcgt 4380

tcgcgacgcg aggctggatg gccttcccca ttatgattct tctcgcttcc ggcggcatcg 4440

ggatgcccgc gttgcaggcc atgctgtcca ggcaggtaga tgacgaccat cagggacagc 4500

ttcaaggatc gctcgcggct cttaccagcc taacttcgat cactggaccg ctgatcgtca 4560

cggcgattta tgccgcctcg gcgagcacat ggaacgggtt ggcatggatt gtaggcgccg 4620

ccctatacct tgtctgcctc cccgcgttgc gtcgcggtgc atggagccgg gccacctcga 4680

cctgaatgga agccggcggc acctcgctaa cggattcacc actccaagaa ttggagccaa 4740

tcaattcttg cggagaactg tgaatgcgca aaccaaccct tggcagaaca tatccatcgc 4800

gtccgccatc tccagcagcc gcacgcggcg catctcgggc agcgttgggt cctggccacg 4860

ggtgcgcatg atcgtgctcc tgtcgttgag gacccggcta ggctggcggg gttgccttac 4920

tggttagcag aatgaatcac cgatacgcga gcgaacgtga agcgactgct gctgcaaaac 4980

gtctgcgacc tgagcaacaa catgaatggt cttcggtttc cgtgtttcgt aaagtctgga 5040

aacgcggaag tcagcgccct gcaccattat gttccggatc tgcatcgcag gatgctgctg 5100

gctaccctgt ggaacaccta catctgtatt aacgaagcgc tggcattgac cctgagtgat 5160

ttttctctgg tcccgccgca tccataccgc cagttgttta ccctcacaac gttccagtaa 5220

ccgggcatgt tcatcatcag taacccgtat cgtgagcatc ctctctcgtt tcatcggtat 5280

cattaccccc atgaacagaa attccccctt acacggaggc atcaagtgac caaacaggaa 5340

aaaaccgccc ttaacatggc ccgctttatc agaagccaga cattaacgct tctggagaaa 5400

ctcaacgagc tggacgcgga tgaacaggca gacatctgtg aatcgcttca cgaccacgct 5460

gatgagcttt accgcagctg cctcgcgcgt ttcggtgatg acggtgaaaa cctctgacac 5520

atgcagctcc cggagacggt cacagcttgt ctgtaagcgg atgccgggag cagacaagcc 5580

cgtcagggcg cgtcagcggg tgttggcggg tgtcggggcg cagccatgac ccagtcacgt 5640

agcgatagcg gagtgtatac tggcttaact atgcggcatc agagcagatt gtactgagag 5700

tgcaccatat gcggtgtgaa ataccgcaca gatgcgtaag gagaaaatac cgcatcaggc 5760

gctcttccgc ttcctcgctc actgactcgc tgcgctcggt cgttcggctg cggcgagcgg 5820

tatcagctca ctcaaaggcg gtaatacggt tatccacaga atcaggggat aacgcaggaa 5880

agaacatgtg agcaaaaggc cagcaaaagg ccaggaaccg taaaaaggcc gcgttgctgg 5940

cgtttttcca taggctccgc cccctgacg agcatcacaa aaatcgacgc tcaagtcaga 6000

ggtggcgaaa cccgacagga ctataaagat accaggcgtt tccccctgga agctccctcg 6060

tgcgctctcc tgttccgacc ctgccgctta ccggatacct gtccgccttt ctcccttcgg 6120

gaagcgtggc gctttctcat agctcacgct gtaggtatct cagttcggtg taggtcgttc 6180

gctccaagct gggctgtgtg cacgaacccc ccgttcagcc cgaccgctgc gccttatccg 6240

gtaactatcg tcttgagtcc aacccggtaa gacacgactt atcgccactg gcagcagcca 6300

ctggtaacag gattagcaga gcgaggtatg taggcggtgc tacagagttc ttgaagtggt 6360

ggcctaacta cggctacact agaaggacag tatttggtat ctgcgctctg ctgaagccag 6420

ttaccttcgg aaaaagagtt ggtagctctt gatccggcaa acaaaccacc gctggtagcg 6480

gtggtttttt tgtttgcaag cagcagatta cgcgcagaaa aaaaggatct caagaagatc 6540

ctttgatctt ttctacgggg tctgacgctc agtggaacga aaactcacgt taagggattt 6600

tggtcatgag attatcaaaa aggatcttca cctagatcct tttaaattaa aaatgaagtt 6660

ttaaatcaat ctaaagtata tatgagtaaa cttggtctga cagttaccaa tgcttaatca 6720

gtgaggcacc tatctcagcg atctgtctat ttcgttcatc catagttgcc tgactccccg 6780

tcgtgtagat aactacgata cgggagggct taccatctgg ccccagtgct gcaatgatac 6840

cgcgagaccc acgctcaccg gctccagatt tatcagcaat aaaccagcca gccggaaggg 6900

ccgagcgcag aagtggtcct gcaactttat ccgcctccat ccagtctatt aattgttgcc 6960

gggaagctag agtaagtagt tcgccagtta atagtttgcg caacgttgtt gccattgctg 7020

caggcatcgt ggtgtcacgc tcgtcgtttg gtatggcttc attcagctcc ggttcccaac 7080

gatcaaggcg agttacatga tcccccatgt tgtgcaaaaa agcggttagc tccttcggtc 7140

ctccgatcgt tgtcagaagt aagttggccg cagtgttatc actcatggtt atggcagcac 7200

tgcataattc tcttactgtc atgccatccg taagatgctt ttctgtgact ggtgagtact 7260

caaccaagtc attctgagaa tagtgtatgc ggcgaccgag ttgctcttgc ccggcgtcaa 7320

cacgggataa taccgcgcca catagcagaa ctttaaaagt gctcatcatt ggaaaacgtt 7380

cttcggggcg aaaactctca aggatcttac cgctgttgag atccagttcg atgtaaccca 7440

ctcgtgcacc caactgatct tcagcatctt ttactttcac cagcgtttct gggtgagcaa 7500

aaacaggaag gcaaaatgcc gcaaaaaagg gaataagggc gacacggaaa tgttgaatac 7560

tcatactctt cctttttcaa tattattgaa gcatttatca gggttattgt ctcatgagcg 7620

gatacatatt tgaatgtatt tagaaaaata aacaaatagg ggttccgcgc acatttcccc 7680

gaaaagtgcc acctgacgtc taagaaacca ttattatcat gacattaacc tataaaaata 7740

ggcgtatcac gaggcccttt cgtcttcaa 7769

<210> 34
<211> 2000
<212> DNA
<213> Escherichia coli

<220>
<221> gene
<222> (1)..(2000)
<223> DNA sequence of the deleted aroE region

<400> 34
actacgtccg tcctctgaaa tcttcagcgg atggacatat cgtcaaagtt ctggaggggc 60

aggtttgccc tgcatgtggc gcaaatctgg tattacgcca gggacgcttt ggtatgttta 120

ttggttgcat taactaccct gaatgcgaac ataccgaact tatcgataaa ccggacgaaa 180

cagcaattac atgcccccaa tgtcggacgg gccatctggt ccagcgccgc tcccgttatg 240

gcaaaacatt tcactcttgt gatcgctacc cggagtgtca atttgccatt aacttcaaac 300

ccatagctgg agaatgccct gagtgtcatt atccgctact catcgaaaag aaaaccgcgc 360

agggtgtaaa acacttttgt gccagtaaac aatgtggaaa gccggtttcg gcggaataat 420

aacgtgaata ataacctgca aagagacgct atcgcagctg cgatagatgt tctcaatgaa 480

gaacgtgtca tcgcctatcc aacggaagcc gttttcggtg ttgggtgcga tcctgatagc 540

gaaacagcag tgatgcgact gttggagtta aaacagcgtc cggttgataa ggggctgatt 600

ttaatcgcag caaattacga gcagcttaaa ccctatattg atgacaccat gttgactgac 660

gtgcagcgtg aaaccatttt ttcccgctgg ccaggtcctg tcacctttgt ctttcccgcg 720

cctgcgacaa caccgcgctg gttgacgggc cgctttgatt cgcttgctgt acgagtcacc 780

gaccatccgt tggtggttgc tttgtgccag gcttatggta aaccgctggt ttctaccagt 840

gccaacttga gtggattgcc accttgtcga acagtagacg aagttcgcgc acaatttggc 900

gcggcgttcc cggttgtgcc tggtgaaacg ggggggcgtt taaatccttc agaaatccgc 960

gatgccctga cgggtgaact gtttcgacag gggtaacata atcaggccat ccagtttccg 1020

gacagggaag agtgggacga gaataaaaaa tgtgtatgtt ttcccgctct cgtgaatggt 1080

atgcaactga catgcgcgat ctctggcgag agtctggcgt atcgctttac tggagatacg 1140

ccagaacagt ggttagcgag ttttcgtcag catcgctggg acctggaaga agaagcggaa 1200

aacttaattc aggaacaaag tgaagatgat caaggctggg tctggttacc ctgatccaga 1260

tattcgtcct tccatttcac gtaattattc gcggaatagc gtaacccagc cttctcttca 1320

tcacttaacg ggcggatctg tttgacgggg ctaccgagat acagatatcc gctctccagc 1380

cgtttatttt gtgggaccag actacccgca ccaatcatca catcatcttc tactattgcg 1440

ccatcaagta aaattgagcc catcccaacc aaaactcgat tgccaatggt gcagccgtgg 1500

agcatcacct tgtgaccaac agtgacatct tcgccaatgg ttaatgggtt gccatctggg 1560

ttgtacgagg atttatgagt gacatgcaac atactgccat cctggatatt ggtgcgtgct 1620

ccgatctgta cataatgtac atctccacga atcacaacga gcggccagat ccccacatca 1680

tcagccagac gaacgtcacc aatcacgaca ctgctatcgt cgatcattac gcgctgaccg 1740

atttgtggaa aaagatcgcg gtatgggcgt aaaacatcag acatacttac ctcagcaata 1800

aatgatttac taatgacttt gggggcatta ttggccttgt gcaagtcttt tagtatgcaa 1860

aaaagcaccg ttttgtgtgc gattgcagca aaaagggtga aaaaacaaca aacagaaaaa 1920

aagatcaaaa aaatacttgt gcaaaaaatt gggatcccta taatgcgcct ccgttgagac 1980

gacaacgtga aacacttcac 2000

<210> 35
<211> 2460
<212> DNA
<213> Escherichia coli

<220>
<221> gene

<222> (1)..(2460)

<223> DNA sequence of the integrated cassette ack::P15aroB

<400> 35

gatcggcggc ataaaacgga tcgcataacg cgtcatcttg ataacgcgat tttcgacaaa 60

gaccggggca aggcgttttt ccagcggcca cgtctttgag taatgctgtc cccggcgaaa 120

caagctaaaa aaattaacag aacgattatc cggcgttgac atgcttcacc tcaacttcac 180

atataaagat tcaaaaattt gtgcaaattc acaactcagc gggacaacgt tcaaaacatt 240

ttgtcttcca tacccactat caggtatcct ttagcagcct gaaggcctaa gtagtacata 300

ttcattgagt cgtcaaattc atatacatta tgccattggc tgaaaattac gcaaaatggc 360

atagactcaa gatatttctt ccatcatgca aaaaaaaatt tgcagtgcat gatgttaatc 420

ataaatgtcg gtgtcatcat gcgctacgct ctatggctcc ctgacgtttt tttagccacg 480

tatcaattat aggtacttcc ctcgaggcta ttgacgacag ctatggttca ctgtccacca 540

accaaaactg tgctcagtac cgccaatatt tctcccttga ggggtacaaa gaggtgtccc 600

tagaagagat ccacgctgtg taaaaatttt acaaaaaggt attgactttc cctacagggt 660

gtgtaataat ttaattacag gcgggggcaa ccccgcctgt tctagaggag gaggaatcgc 720

catggagagg attgtcgtta ctctcgggga acgtagttac ccaattacca tcgcatctgg 780

tttgtttaat gaaccagctt cattcttacc gctgaaatcg ggcgagcagg tcatgttggt 840

caccaacgaa accctggctc ctctgtatct cgataaggtc cgcggcgtac ttgaacaggc 900

gggtgttaac gtcgatagcg ttatcctccc tgacggcgag cagtataaaa gcctggctgt 960

actcgatacc gtctttacgg cgttgttaca aaagccgcat ggtcgcgata ctacgctggt 1020

ggcgcttggc ggcggcgtag tgggcgatct gaccggcttc gcggcggcga gttatcagcg 1080

cggtgttcgt ttcattcaag tcccgacgac gttactgtcg caggtcgatt cctccgttgg 1140

cggcaaaact gcggtcaacc atcccctcgg taaaaacatg attggcgcgt tctaccagcc 1200

tgcttcagtg gtggtggatc tcgactgtct gaaaacgctt cccccgcgtg agttagcgtc 1260

ggggctggca gaagtcatca aatacggcat tattcttgac ggtgcgtttt tcaactggct 1320

ggaagagaat ctggatgcgt tgttgcgtct ggacggtccg gcaatggcgt actgtattcg 1380

ccgttgttgt gaactgaagg cagaagttgt cgccgccgac gagcgcgaaa ccgggttacg 1440

tgctttactg aatctgggac acacctttgg tcatgccatt gaagctgaaa tggggtatgg 1500

caattggtta catggtgaag cggtcgctgc gggtatggtg atggcggcgc ggacgtcgga 1560

acgtctcggg cagtttagtt ctgccgaaac gcagcgtatt ataaccctgc tcacgcgggc 1620

tgggttaccg gtcaatgggc cgcgcgaaat gtccgcgcag gcgtatttac cgcatatgct 1680

gcgtgacaag aaagtccttg cgggagagat gcgcttaatt cttccgttgg caattggtaa 1740

gagtgaagtt cgcagcggcg tttcgcacga gcttgttctt aacgccattg ccgattgtca 1800

atcagcgtaa tcatcgttca tgcctgatgc cgctatgtag gccggataag gcgttcacgc 1860

cgcatccggc aaccgatgcc tgatgcgacg cggtcgcgtc ttatcaggcc tacaggtcga 1920

tgccgatatg tacatcgtat tcggcaatta atacatagca tttcacaccg ccagctcagc 1980

tggcggtgct gttttgtaac ccgccaaatc ggcggtaacg aaagaggata aaccgtgtcc 2040

cgtattatta tgctgatccc taccggaacc agcgtcggtc tgaccagcgt cagccttggc 2100

gtgatccgtg caatggaacg caaaggcgtt cgtctgagcg ttttcaaacc tatcgctcag 2160

ccgcgtaccg gtggcgatgc gcccgatcag actacgacta tcgtgcgtgc gaactcttcc 2220

accacgacgg ccgctgaacc gctgaaaatg agctacgttg aaggtctgct ttccagcaat 2280

cagaaagatg tgctgatgga agagatcgtc gcaaactacc acgctaacac caaagacgct 2340

gaagtcgttc tggttgaagg tctggtcccg acacgtaagc accagtttgc ccagtctctg 2400

aactacgaaa tcgctaaaac gctgaatgcg gaaatcgtct tcgttatgtc tcagggcact 2460

<210> 36
<211> 1000
<212> DNA
<213> Escherichia coli

<220>

<221> gene

<222> (1)..(1000)

<223> DNA sequence of the poxB region

<400> 36

gcggcccggc tccgtatatg gattgggtag agcaggaagt gaaagcgctc ggcgtgacgc 60

gtttctttaa agagaaattc ttcaccccag tagcggaagc agcgaccagc ggtctgaaat 120

tcaccaaact gcaaccggca cgagaatttt acgccccggt tggcaccacg ctactggagg 180

cgctggaaag caataacgtt ccggttgtcg ccgcctgccg tgcgggtgtt tgcggctgct 240

gtaagacaaa agtggtttcc ggtgaatata cggtgagcag cacaatgacg ctgaccgacg 300

ccgaaatcgc tgaaggttac gtactggcct gctcctgcca tccgcagggg gatttggttc 360

tcgcataatc gccttatgcc cgatgatatt cctttcatcg ggctatttaa ccgttagtgc 420

ctcctttctc tcccatccct tccccctccg tcagatgaac taaacttgtt accgttatca 480

cattcaggag atggagaacc aaagggtggc atttcccgtc ataataagga catgccatga 540

ttgatttacg cagtgatacc gttacccgac cgagccgcgc catgctcgaa gcaatgatgg 600

ccgccccggt tggggacgac gtttacggag acgaccctac cgttaatgct ctgcaggact 660

acgccgcaga gctttccggt aaagaagccg ccatttttct gccgaccggc actcaggcca 720

acctggtcgc tctgctcagt cactgcgaac gtggcgaaga gtatattgtc ggtcaggccg 780

cgcataacta tctgtttgaa gccggtggcg cagcggtgct gggcagtatt cagccgcaac 840

ccatcgacgc ggctgccgac ggcacgctac cgctggataa agtggcgatg aaaatcaaac 900

ccgacgatat ccatttcgcc cgcaccaaat tactcagtct ggaaaacacc cacaacggca 960

aagtgctgcc gcgtgaatac ctgaaagaag catgggaatt 1000

<210> 37
<211> 3392
<212> DNA
<213> Escherichia coli

<220>
<221> gene
<222> (1)..(3392)
<223> DNA sequence of the integrated cassette poxB::tktA

<400> 37
gcggcccggc tccgtatatg gattgggtag agcaggaagt gaaagcgctc ggcgtgacgc 60

gtttctttaa agagaaattc ttcaccccag tagcggaagc agcgaccagc ggtctgaaat 120

tcaccaaact gcaaccggca cgagaatttt acgccccggt tggcaccacg ctactggagg 180

cgctggaaag caataacgtt ccggttgtcg ccgcctgccg tgcgggtgtt tgcggctgct 240

gtaagacaaa agtggtttcc ggtgaatata cggtgagcag cacaatgacg ctgaccgacg 300

ccgaaatcgc tgaaggttac gtactggcct gctcctgcca tccgcagggg gatttggttc 360

tcgcataatc gccttatgcc cgatgatatt cctttcatcg ggctatttaa ccgttagtgc 420

ctcctttctc tcccatccct tccccctccg tcagatgaac taaacttgtt accgttatca 480

cattcaggag atggagaacc aaggaaaagc gcaacggacg ggcgagtaga ttgcgcaaca 540

tgcgagcatg atccagagat ttctgaagca gcaaaaggat gttccatgta catgacgcgc 600

ggcttgcggt aaattgttgg caaattttcc ggcgtagccc aaaacgcgct gtcgtcaagt 660

cgttaagggc gtgcccttca tcatccgatc tggagtcaaa atgtcctcac gtaaagagct 720

tgccaatgct attcgtgcgc tgagcatgga cgcagtacag aaagccaaat ccggtcaccc 780

gggtgcccct atgggtatgg ctgacattgc cgaagtcctg tggcgtgatt tcctgaaaca 840

caacccgcag aatccgtcct gggctgaccg tgaccgcttc gtgctgtcca acggccacgg 900

ctccatgctg atctacagcc tgctgcacct caccggttac gatctgccga tggaagaact 960

gaaaaacttc cgtcagctgc actctaaaac tccgggccac ccggaagtag gttataccgc 1020

tggtgtggaa accaccaccg gtccgctggg tcagggtatt gccaacgcag tcggtatggc 1080

gattgcagaa aaaacgctgg cggcgcagtt taaccgtcca ggtcacgaca ttgtcgacca 1140

ctacacctac gccttcatgg gcgacggctg catgatggaa ggcatctccc acgaagtttg 1200

ctctctggcg ggtacgctga agctgggtaa actgattgcg ttctacgatg acaacggtat 1260

ctcaatcgat ggtcacgttg aaggctggtt cactgacgac accgcaatgc gtttcgaagc 1320

ttacggctgg cacgttattc gcgacatcga cggtcatgac gcggcatcca tcaaacgcgc 1380

agtagaagaa gcgcgcgcag tgactgacaa accgtccctg ctgatgtgca aaaccatcat 1440

cggtttcggt tccccgaaca aagccggtac ccacgactcc cacggtgcgc cgctgggcga 1500

cgctgaaatt gccctgaccc gcgaacagct gggctggaaa tacgcgccgt tcgaaatccc 1560

gtctgaaatc tatgctcagt gggatgcgaa agaagcaggc caggcgaaag aatctgcatg 1620

gaatgagaag tttgcggctt acgcgaaagc ttatccgcag gaagcggctg aatttacccg 1680

ccgtatgaaa ggcgaaatgc cgtctgactt cgacgccaaa gcgaaagagt ttatcgctaa 1740

actgcaggct aatccggcga aaatcgccag ccgtaaagcg tcgcagaatg ctatcgaagc 1800

gttcggcccg ctgttgcctg aattcctcgg cggctctgct gacctggcac cgtctaacct 1860

gaccctgtgg tctggttcta aagcaatcaa cgaagatgct gcaggtaact acatccacta 1920

cggtgttcgc gagttcggta tgaccgcgat tgctaacggt atctccctgc acggtggttt 1980

cctgccgtac acctccacct tcctgatgtt cgtggaatac gcacgtaacg ccgtacgtat 2040

ggctgcgctg atgaaacagc gtcaggtgat ggtttacacc cacgactcca tcggtctggg 2100

cgaagatggc ccgactcacc agccggttga gcaggtcgct tctctgcgcg tgaccccgaa 2160

catgtctaca tggcgtccgt gtgaccaggt tgaatccgcg gtcgcgtgga aatacggcgt 2220

tgagcgtcag gacggcccga ctgcgcttat cctctcccgt cagaacctgg cgcagcagga 2280

acgaactgaa gagcaactgg caaacatcgc gcgcggtggt tatgtgctga aagactgcgc 2340

cggtcagccg gaactgattt tcatcgctac cggttcagaa gttgaactgg ctgttgctgc 2400

ctacgaaaaa ctgactgccg aaggcgtgaa agcgcgcgtg gtgtccatgc cgtctaccga 2460

cgcatttgac aagcaggatg ctgcttaccg tgaatccgta ctgccgaaag cggttactgc 2520

acgcgttgct gtagaagcgg gtattgctga ctactggtac aagtatgttg gcctgaacgg 2580

tgctatcgtc ggtatgacca ccttcggtga atctgctccg gcagagctgc tgtttgaaga 2640

gttcggcttc actgttgata acgttgttgc gaaagcaaaa gaactgctgt aattagcatt 2700

tcgggtaaaa aggtcgcttc ggcgaccttt tttattacct tgatatgtcc gtttgcggac 2760

aagcaataga taaagcgtgt tgtagatcac aaatatttat atgcaataaa tatcaattat 2820

gtaatatgca tcacgatatg cgtattgaca tttgttgtta taactataac tcaatgttat 2880

ataagaaatt aaaaagggtg gcatttcccg tcataataag gacatgccat gattgattta 2940

cgcagtgata ccgttacccg accgagccgc gccatgctcg aagcaatgat ggccgccccg 3000

gttggggacg acgtttacgg agacgaccct accgttaatg ctctgcagga ctacgccgca 3060

gagctttccg gtaaagaagc cgccattttt ctgccgaccg gcactcaggc caacctggtc 3120

gctctgctca gtcactgcga acgtggcgaa gagtatattg tcggtcaggc cgcgcataac 3180

tatctgtttg aagccggtgg cgcagcggtg ctgggcagta ttcagccgca acccatcgac 3240

gcggctgccg acggcacgct accgctggat aaagtggcga tgaaaatcaa acccgacgat 3300

atccatttcg cccgcaccaa attactcagt ctggaaaaca cccacaacgg caaagtgctg 3360

ccgcgtgaat acctgaaaga agcatgggaa tt 3392

<210> 38
<211> 1045
<212> DNA
<213> Escherichia coli

<220>
<221> gene
<222> (1)..(1045)
<223> DNA sequence of the ptsHI region

<400> 38
gaagatgaaa gctttaccaa caagaatatt gtggttattc taccatcatc gggtgagcgt 60

tatttaagca ccgcattgtt tgccgatctc ttcactgaga aagaattgca acagtaatgc 120

cagcttgtta aaaatgcgta aaaaagcacc tttttaggtg ctttttttgtg gcctgcttca 180

aactttcgcc cctcctggca ttgattcagc ctgtcggaac tggtatttaa ccagactaat 240

tattttgatg cgcgaaatta atcgttacag gaaaagccaa agctgaatcg attttatgat 300

ttggttcaat tcttccttta gcggcataat gtttaatgac gtacgaaacg tcagcggtca 360

acacccgcca gcaatggact gtattgcgct cttcgtgcgt cgcgtctgtt aaaaactggc 420

gctaacaata caggctaaag tcgaaccgcc aggctagact ttagttccac aacactaaac 480

ctataagttg gggaaataca atgttccagc aagaagttac cattaccgct ccgacaatct 540

gctaatccac gagatgcggc ccaatttact gcttaggaga agatcatggg tttgttcgat 600

aaactgaaat ctctggtttc cgacgacaag aaggataccg gaactattga gatcattgct 660

ccgctctctg gcgagatcgt caatatcgaa gacgtgccgg atgtcgtttt tgcggaaaaa 720

atcgttggtg atggtattgc tatcaaacca acgggtaaca aaatggtcgc gccagtagac 780

ggcaccattg gtaaaatctt tgaaaccaac cacgcattct ctatcgaatc tgatagcggc 840

gttgaactgt tcgtccactt cggtatcgac accgttgaac tgaaaggcga aggcttcaag 900

cgtattgctg aagaaggtca gcgcgtgaaa gttggcgata ctgtcattga atttgatctg 960

ccgctgctgg aagagaaagc caagtctacc ctgactccgg ttgttatctc caacatggac 1020

gaaatcaaag aactgatcaa actgt 1045

<210> 39

<211> 4595

<212> DNA

<213> Escherichia coli

<220>

<221> gene

<222> (1)..(4595)

<223> DNA sequence of the integrated cassette tdc::glf-glk

<400> 39

ctgatttctt tgtcgctgat cccttactgg aactctgcag ttatcgacca ggttgacctc 60

ggttcgctgt cgttaaccgg tcatgacggt atcctgatca ctgtctggct ggggatttcc 120

atcatggttt tctcctttaa cttctcgcca atcgtctctt ccttcgtggt ttctaaacgt 180

gaagagtatg agaaagactt cggtcgcgac ttcaccgaac gtaaatgttc ccaaatcatt 240

tctcgtgcca gcatgctgat ggttgcagtg gtgatgttct ttgcctttag ctgcctgttt 300

actctgtctc cggccaacat ggcggaagcc aaagcgcaga atattccagt gctttcttat 360

ctggctaacc actttgcgtc catgaccggt accaaaacaa cgttcgcgat tacactggaa 420

tatgcggctt ccatcatcgc actcgtggct atcttcaaat ctttcttcgg tcactatctg 480

gggacgctgg aaggcttgaa tggtctgatt ctgaagttcg gttataaagg tgacaaaacc 540

aaagtgtcgc tgggtaaact gaatactctc agcatgatct tcatcatggg ctccacctgg 600

gttgttgcct acgccaaccc gaacatcctc gacctgattg aagccatggg cgcaccgatt 660

atcgcatccc tgctgtgcct gttgccgatg tatgccatcc gtaaagcgcc gtctctggcg 720

aaataccgtg gtcgtctgga taacgtgttt gttaccgtga ttggtctgct gaccatcctg 780

aacatcgtat acaaactgtt ttaatccgta actcaggatg agaaaagaga tgaatgaatt 840

tccggttgtt ttggttatta actgtggttc gtcttcgatt aagttttccg tactcgatgc 900

cagcgactgt gaagtattaa tgtcaggtat tgccgacggt attaactcgg aaaatgcatt 960

cttatccgta aatgggggag agccagcacc gctggctcac cacagctacg aaggtgcatt 1020

gaaggcaatt gcatttgaac tggaaaaacg gagtttaaat gacagcgtgg ccttaattgg 1080

tgcaaaagtg gctgtgactg taaaaagaaa tcgaaaaaga ccgttttgtg tgaaaacggt 1140

ctttttgttt ccttttaacc aactgccata actcgaggcc tacctagctt ccaagaaaga 1200

tatcctaaca gcacaagagc ggaaagatgt tttgttctac atccagaaca acctctgcta 1260

aaattcctga aaaattttgc aaaaagttgt tgactttatc tacaaggtgt ggtataataa 1320

tcttaacaac agcaggacgc tctagaggga gaggaatcgc catgagttct gaaagtagtc 1380

agggtctagt cacgcgacta gccctaatcg ctgctatagg cggcttgctt ttcggttacg 1440

attcagcggt tatcgctgca atcggtacac cggttgatat ccattttatt gcccctcgtc 1500

acctgtctgc tacggctgcg gcttcccttt ctgggatggt cgttgttgct gttttggtcg 1560

gttgtgttac cggttctttg ctgtctggct ggattggtat tcgcttcggt cgtcgcggcg 1620

gattgttgat gagttccatt tgtttcgtcg ccgccggttt tggtgctgcg ttaaccgaaa 1680

aattatttgg aaccggtggt tcggctttac aaatttttttg ctttttccgg tttcttgccg 1740

gtttaggtat cggtgtcgtt tcaaccttga ccccaaccta tattgctgaa attgctccgc 1800

cagacaaacg tggtcagatg gtttctggtc agcagatggc cattgtgacg ggtgctttaa 1860

ccggttatat ctttacctgg ttactggctc atttcggttc tatcgattgg gttaatgcca 1920

gtggttggtg ctggtctccg gcttcagaag gcctgatcgg tattgccttc ttattgctgc 1980

tgttaaccgc accggatacg ccgcattggt tggtgatgaa gggacgtcat tccgaggcta 2040

gcaaaatcct tgctcgtctg gaaccgcaag ccgatcctaa tctgacgatt caaaagatta 2100

aagctggctt tgataaagcc atggacaaaa gcagcgcagg tttgtttgct tttggtatca 2160

ccgttgtttt tgccggtgta tccgttgctg ccttccagca gttagtcggt attaacgccg 2220

tgctgtatta tgcaccgcag atgttccaga atttaggttt tggagctgat acggcattat 2280

tgcagaccat ctctatcggt gttgtgaact tcatcttcac catgattgct tcccgtgttg 2340

ttgaccgctt cggccgtaaa cctctgctta tttggggtgc tctcggtatg gctgcaatga 2400

tggctgtttt aggctgctgt ttctggttca aagtcggtgg tgttttgcct ttggcttctg 2460

tgcttcttta tattgcagtc tttggtatgt catggggccc tgtctgctgg gttgttctgt 2520

cagaaatgtt cccgagttcc atcaagggcg cagctatgcc tatcgctgtt accggacaat 2580

ggttagctaa tatcttggtt aacttcctgt ttaaggttgc cgatggttct ccagcattga 2640

atcagacttt caaccacggt ttctcctatc tcgttttcgc agcattaagt atcttaggtg 2700

gcttgattgt tgctcgcttc gtgccggaaa ccaaaggtcg gagcctggat gaaatcgagg 2760

agatgtggcg ctcccagaag tagttaaact tgctttggct gaatcctttt gtctttttta 2820

gataagtctt aaccaattat actttttgtt tacaacgatg gtataaagcg ggcggactta 2880

ttttacctgt tgggtagcct tctgatttca gaaaggaatt attatggaaa ttgttgcgat 2940

tgacatcggt ggaacgcatg cgcgtttctc tattgcggaa gtaagcaatg gtcgggttct 3000

ttctcttgga gaagaaacaa cttttaaaac ggcagaacat gctagcttgc agttagcttg 3060

ggaacgtttc ggtgaaaaac tgggtcgtcc tctgccacgt gccgcagcta ttgcatgggc 3120

tggcccggtt catggtgaag ttttaaaact taccaataac ccttgggtat taagaccagc 3180

tactctgaat gaaaagctgg acatcgatac gcatgttctg atcaatgact tcggcgcggt 3240

tgcccacgcg gttgcgcata tggattcttc ttatctggat catatttgtg gtcctgatga 3300

agcgcttcct agcgatggtg ttatcactat tcttggtccg ggaacgggct tgggtgttgc 3360

ccatctgttg cggactgaag gccgttattt cgtcatcgaa actgaaggcg gtcatatcga 3420

ctttgctccg cttgacagac ttgaagacaa aattctggca cgtttacgtg aacgtttccg 3480

ccgcgtttct atcgaacgca ttatttctgg cccgggtctt ggtaatatct acgaagcact 3540

ggctgccatt gaaggcgttc cgttcagctt gctggatgat attaaattat ggcagatggc 3600

tttggaaggt aaagacaacc ttgctgaagc cgctttggat cgcttctgct tgagccttgg 3660

cgctatcgct ggtgatcttg ctttggcaca gggtcgaacc agtgttgtta ttggcggtgg 3720

tgtcggtctt cgtatcgctt cccatttgcc agaatctggt ttccgtcagc gctttgtttc 3780

aaaaggacgc tttgaacgcg tcatgtccaa gattccggtt aagttgatta cttatccgca 3840

gcctggactg ttgggtgcgc agctgcctat gccaacaaat attctgaagt tgaataatat 3900

tttttaatat tatgaactga atttaagagg ctgccttccg ataaaatcgg gaggtggcct 3960

tttttatatt ttttactaaa aaatgaagac aaaaaagtct taagtaagaa taatattatt 4020

attaactttt gatatatttt gtattagtgg atccgccctc ccgctggaaa ttgaagccat 4080

cgcagtacgt agtgcgtaaa gcctcgtgag cgggacggtc gtaaggtcgt tccgctccac 4140

ttcactgaac ggcaatccga gggtgtggat atgattagtg cattcgatat tttcaaaatt 4200

gggattggtc cctccagttc gcataccgtg gggccaatga atgccggaaa aagttttatt 4260

gatcggctgg aaagtagcgg cttattaacc gcgacgagcc atattgtggt cgatctgtac 4320

gggtcgttgt cactgacggg caaaggccat gccacggatg tcgccatcat catgggactg 4380

gcaggaaaca gtccgcagga tgttgtcatt gatgagatcc ctgcatttat agagttagta 4440

acgcgcagcg ggcggctgcc agtggcatct ggtgcgcata ttgttgattt tcctgtagca 4500

aagaacatta tcttccatcc cgaaatgttg cctcgccatg agaacggaat gcggatcact 4560

gcctggaagg gacaggaaga gctattaagt aaaac 4595

<210> 40
<211> 1069
<212> DNA
<213> Escherichia coli

<220>
<221> gene
<222> (1)..(1069)
<223> DNA sequence of the galP region

<400> 40
actttggtcg tgaacatttc ccgtgggaaa aaaccgacaa agcgcagctg ctgcgcgatg 60

ctgccggtct gaagtaatct ttcttcacct gcgttcaaag gccagcctcg cgctggcctt 120

tttcttttgg ataggcgttc acgccgcatc cggcaaaaaa accgcccgca caataacatc 180

attcttcctg atcacgtttc accgcagatt atcatcacaa ctgaaaccga ttacaccaac 240

cacaacagac aaagatttgt aatattttca tattattatt cggttttcac agttgttaca 300

tttcttttca gtaaagtctt aattgcagat aacagcgttt aatctatgat gatataactc 360

aattattttc atgcacttaa atcataacta agataaatgt tagtgtaagc gattacactg 420

atgtgatttg cttcacatct ttttacgtcg tactcaccta tcttaattca caataaaaaa 480

taaccatatt ggagggcatc atgcctgacg ctaaaaaaca ggggcggtca aacaaggcaa 540

tgacgtttga aataggcgct cacgattaat ctccccaagc ttcctcccat cgcggaggaa 600

gccacctctt gcagtcatct tttcttcgct ctatcctctg ccgctatgaa aacatcccgt 660

ctccctatcg ccatccaaca ggccgttatg cgtcgcctgc gggaaaaact cgcccaggcc 720

aacctgaagc tagggcgtaa ctacccggag ccaaaactct cttacaccca gcgcggaacc 780

tccgccggaa cggcctggct ggaaagctat gaaattcgcc tcaatcccgt tttgctgttg 840

gaaaacagtg aagcttttat tgaagaagtg gtaccgcacg aactggcaca tttgctggta 900

tggaaacatt tcggccgcgt agcgccacat ggcaaagagt ggaagtggat gatggaaaac 960

gtgctgggtg ttcccgcccg tcgtacgcat cagttcgaac tgcaatccgt gcgtcgcaac 1020

accttcccct accgctgcaa gtgccaggag catcagctta ccgtacgcc 1069

<210> 41

<211> 6100

<212> DNA

<213> Escherichia coli

<220>

<221> gene

<222> (1)..(6100)

<223> MYR352 adhE::P15-catAX , PR-aroY, P26-quiC

<400> 41

ttgattttca taggttaagc aaatcatcac cgcactgact atactctcgt attcgagcag 60

atgatttact aaaaaagttt aacattatca ggagagcatt agcttgctat tgacgacagc 120

tatggttcac tgtccaccaa ccaaaactgt gctcagtacc gccaatattt ctcccttgag 180

gggtacaaag aggtgtccct agaagagatc cacgctgtgt aaaaatttta caaaaaggta 240

ttgactttcc ctacagggtg tgtaataatt taattacagg cgggggcaac cccgcctgtt 300

ctgcagagga ggaatatagc catggaagtg aaaatcttca acacccagga tgttcaggat 360

tttctgcgtg ttgcaagcgg tctggaacaa gagggtggta atccgcgtgt taaacaaatt 420

attcatcgtg ttctgagcga cctgtataaa gcaattgaag atctgaatat caccagcgac 480

gaatattggg caggcgttgc atatctgaat cagctgggtg caaatcaaga agcaggtctg 540

ctgagtccgg gtctgggttt tgatcattat ctggatatgc gtatggatgc agaagatgca 600

gcactgggta ttgaaaatgc aacaccgcgt accattgaag gtccgctgta tgttgcgggt 660

gcaccggaaa gcgttggtta tgcacgcatg gatgatggta gcgatccgaa tggtcatacc 720

ctgattctgc atggcaccat ttttgatgca gatggtaaac cgctgccgaa tgcaaaagtt 780

gaaatttggc atgcaaacac caaaggcttt tatagccatt ttgatccgac cggtgaacag 840

caggccttta atatgcgtcg tagcattatt accgatgaga atggtcagta tcgtgttcgt 900

accattctgc ctgccggtta tggttgtcct ccggaaggtc cgacccagca actgctgaac 960

caactgggtc gtcatggtaa tcgtccggca catattcatt attttgttag cgcagatggt 1020

caccgtaaac tgaccaccca gattaatgtt gccggtgatc cgtataccta tgatgatttt 1080

gcatatgcca cccgtgaagg tctggttgtt gatgcagttg aacataccga tccggaagca 1140

attaaagcca atgatgtgga aggtcctttt gccgaaatgg tgtttgatct gaaactgacc 1200

cgtctggttg atggtgttga taatcaggtt gtggatcgtc cgcgtctggc agtttaatac 1260

accaaaatgg ttcaaaatta tcaggcgagt gatcatgatc actggcctgt ttttatttca 1320

gggaagggtg gagacaatta cgtggataat cagatcatcc aagaaaccgt ggataaaatt 1380

ctgagcgttc tgccgaatca ggcaggtcag ctggcacgtc tggtgcgtct gatgcaattt 1440

gcatgcgatc cgaccattac cgttattggc aaatataacc atggtaaaag ccgtctgctg 1500

aatgaactga ttggcaccga tatctttagc gttgcagata aacgtgaaac cattcagctg 1560

gccgaacata aacaggatca ggttcgttgg ctggatgcac ctggtctgga tgccgatgtt 1620

gcagcagttg atgatcgtca tgcatttgaa gcagtttgga cccaggcaga tattcgtctg 1680

tttgttcata gcgttcgtga aggtgaactg gatgcaaccg aacaccatct gctgcaacag 1740

ctgattgaag atgccgatca tagccgtcgt cagaccattc tggttctgac ccagattgat 1800

cagattccgg atcagaccat cctgacacag attaaaacca gcattgcaca gcaggttccg 1860

aaactggata tttgggcagt tagcgcaacc cgtcatcgtc agggcattga aaacggtaaa 1920

accctgctga tcgaaaaaag cggtattggt gcactgcgcc ataccctgga acaggcactg 1980

gcacaggtgc cgagcgcacg tacctatgaa aaaaatcgtc tgctgtcaga tctgcaccat 2040

cagctgaaac aactgctgct ggatcagaaa catgttctgc aacaactgca acagacacag 2100

caacagcagc tgcatgattt tgataccggt ctgattaaca ttctggacaa aattcgtgtt 2160

gatctggaac cgattgtgaa tattgatggt caggatcaag cactgaatcc ggatagcttt 2220

gcaaccatgt ttaaaaacac cgcagcaaaa cagcagcgtg ccaaagttca gattgcatat 2280

agccgtgcat gcattgaaat caacagccat ctgattcgcc atggtgttgt tggtctgcct 2340

gcggaacagc agaccaccat taaaagcatt gataccgtga ttgttgccgt gtttggtatc 2400

agcgttaaat ttcgtgatca gctgcgtgcc ctgttttata ccgataccga acgtcagcgt 2460

ctgcaacgtg aatttcgttt ctattttgaa aaaagtgccg gtcgcatgat tctggcagca 2520

aaaattgaac agaccatgcg tcagcagggc tgtattcaga atgccatgat ggcactgcaa 2580

caaatggaaa gcgcagcata aaaacacgga cgccgcaaac ggcgtccgaa tttcttggtc 2640

gaccgttaaa tctatcaccg caagggataa atatctaaca ccgtgcgtgt tgactatttt 2700

acctctggcg gtgataatgg ttgcatgtac taatctagat aaggaatata gccatgaccg 2760

caccgattca ggatctgcgt gatgcaattg ccctgctgca acagcatgat aatcagtatc 2820

tggaaaccga tcatccggtt gatccgaatg cagaactggc aggcgtttat cgtcatattg 2880

gtgccggtgg caccgttaaa cgtccgaccc gtattggtcc ggcaatgatg tttaataaca 2940

ttaaaggtta tccgcacagc cgtattctgg ttggtatgca tgcaagccgt cagcgtgcag 3000

cactgctgct gggttgtgaa gcaagtcagc tggcactgga agttggtaaa gcagttaaaa 3060

aaccggttgc accggtggtt gttccggcaa gcagcgcacc gtgtcaagag cagatttttc 3120

tggcagatga tccggatttt gatctgcgta ccctgctgcc tgcacatacc aataccccga 3180

ttgatgcagg tccgtttttt tgtctgggtc tggccctggc aagcgatccg gtggatgcaa 3240

gcctgaccga tgttaccatt catcgtctgt gtgttcaggg tcgtgatgaa ctgagcatgt 3300

tcctggcagc aggtcgccat attgaagttt ttcgtcagaa agcagaagca gcaggtaaac 3360

cgctgccgat taccattaat atgggtctgg acccagcaat ctatattggc gcatgttttg 3420

aagcaccgac caccccgttt ggttataatg aactgggtgt tgccggtgca ctgcgtcagc 3480

gtccggttga actggttcag ggtgttagcg ttccggaaaa agcaattgca cgtgccgaaa 3540

ttgttattga aggtgaactg ctgcctggtg ttcgtgttcg tgaagatcag cataccaatt 3600

caggtcatgc aatgccggaa tttccgggtt attgtggtgg tgcaaatccg agcctgccgg 3660

ttattaaagt taaagccgtt accatgcgca ataacgcaat tctgcaaacc ctggttggtc 3720

cgggtgaaga acataccacc ctggcaggtc tgccgaccga agcaagcatt tggaatgcag 3780

ttgaagcagc aattccgggt tttctgcaaa atgtttatgc ccataccgca ggcggtggta 3840

aatttctggg tattctgcaa gtgaaaaaac gtcagcctgc cgatgaaggt cgtcagggtc 3900

aggcagccct gctggcgctg gcaacctata gcgaactgaa aaatatcatt ctggtggatg 3960

aggatgtgga cattttgat agtgatgata ttctgtgggc aatgaccacc cgtatgcagg 4020

gtgatgttag cattaccacc attccgggta ttcgcggtca tcagctggac ccgagccaga 4080

caccggaata ttcaccgagc attcgtggta atggtattag ctgcaaaacc atctttgatt 4140

gtaccgttcc gtgggcactg aaaagccatt ttgaacgtgc accgtttgca gatgttgatc 4200

cgcgtccgtt tgcacctgaa tattttgcac gtctggaaaa aaatcagggc agcgcaaaat 4260

aagctaataa caggcctgct ggtaatcgca ggaattttta tttggatgga tccgcctacc 4320

tagcttccaa gaaagatatc ctaacagcac aagagcggaa agatgttttg ttctacatcc 4380

agaacaacct ctgctaaaat tcctgaaaaa ttttgcaaaa agttgttgac tttatctaca 4440

aggtgtggta taataatctt aacaacagca ggacgctccc gggttgagga aaacctaatg 4500

aaactgacca gcctgcgtgt tagcctgctg gcactgggtc tggttaccag cggttttgca 4560

gcagcagaaa cctataccgt tgatcgttat caggatgata gcgaaaaagg tagcctgcgt 4620

tgggcaattg aacagagcaa tgcaaatagc gcacaagaaa accagattct gattcaggca 4680

gttggtaaag caccgtatgt tatcaaagtt gataaaccgc tgcctccgat taaaagcagc 4740

gttaaaatca ttggcaccga gtgggataaa accggtgaat ttattgcaat tgatggcagc 4800

aactatatca aaggcgaagg tgaaaaagca tgtccgggtg caaatccggg tcagtatggc 4860

accaatgttc gtaccatgac cctgcctggt ctggttctgc aagatgttaa tggtgttacc 4920

ctgaaaggtc tggatgttca tcgtttttgt attggtgttc tggttaatcg cagcagcaat 4980

aacctgattc agcataatcg tatcagcaac aattatggtg gtgccggtgt tatgattacc 5040

ggtgatgatg gtaaaggtaa tccgaccagc accaccacca ataataacaa agttctggat 5100

aacgtgttca tcgataatgg tgatggtctg gaactgaccc gtggtgcagc atttaatctg 5160

attgcaaata acctgtttac cagcacaaaa gccaatccgg aaccgagcca gggtattgaa 5220

attctgtggg gtaatgataa tgccgtggtg ggtaacaaat tcgaaaacta ttcagatggc 5280

ctgcaaatca attggggtaa acgtaactat atcgcctata acgaactgac caataacagc 5340

ctgggtttca atctgacagg tgatggtaac attttcgaca gcaataaagt gcatggtaac 5400

cgtattggta ttgccattcg tagtgaaaaa gatgccaatg cacgtattac cctgaccaaa 5460

aatcagattt gggataacgg caaagatatc aaacgttgtg aagccggtgg tagctgtgtt 5520

ccgaatcagc gtctgggtgc aattgttttt ggtgttccgg cactggaaca tgaaggtttt 5580

gttggtagcc gtggcggtgg tgttgttatt gaaccggcaa aactgcaaaa aacctgcacc 5640

cagccgaacc agcagaattg taatgcaatt cctaatcagg gtattcaggc accgaaactg 5700

acagttagca aaaaacagct gaccgttgaa gttaaaggca cccctaatca gcgttataat 5760

gtggaatttt ttggcaatcg taatgccagc agcagcgaag cagaacagta tctgggtagc 5820

attgttgttg ttaccgatca tcagggtctg gcaaaagcaa attgggctcc gaaagttagc 5880

atgccgagcg ttaccgcaaa tgtgacagat catctgggtg cgaccagcga actgagcagc 5940

gcagttaaaa tgcgttaaat gcatgcgcgc cgcgttcgcg cggcgctttt ttttggtact 6000

cagtagcgct gtctggcaac ataaacggcc ccttctgggc aatgccgatc agttaaggat 6060

tagttgaccg atccttaaac tgaggcacta taacggcttc 6100

<210> 42

<211> 594

<212> DNA

<213> Klebsiella pneumoniae

<220>

<221> gene

<222> (1)..(594)

<223> Nucleotide sequence of Klebsiella pneumoniae kpdB gene.

<400> 42

atgaaactga ttattgggat gacgggggcc accggggcac cgcttggggt ggcattgctg 60

caggcgctgc gcgatatgcc ggaggtggaa acccatctgg tgatgtcgaa atgggccaaa 120

accaccatcg agctggaaac gccctggacg gcgcgcgaag tggccgcgct ggcggacttt 180

tcccacagcc cggcagacca ggccgccacc atctcatccg gttcatttcg taccgacggc 240

atgatcgtta ttccctgcag tatgaaaacg cttgcaggca ttcgcgcggg ttatgccgaa 300

gggctggtgg gccgcgcggc ggacgtggtg ctcaaagagg ggcgcaagct ggtgttggtc 360

ccgcgggaaa tgccgctcag cacgatccat ctggagaaca tgctggcgct gtcccgcatg 420

ggcgtggcga tggtcccgcc gatgccagct tactacaacc acccggagac ggttgacgat 480

atcaccaatc atatcgtcac ccgggtgctg gatcagtttg gcctcgacta tcacaaagcg 540

cgccgctgga acggcttgcg cacggcagaa caatttgcac aggagatcga ataa 594

<210> 43

<211> 197

<212> PRT

<213> Klebsiella pneumoniae

<220>

<221> PEPTIDE

<222> (1)..(197)

<223> Amino acid sequence of KpdB protein of Klebsiella pneumoniae

<400> 43

Met Lys Leu Ile Ile Gly Met Thr Gly Ala Thr Gly Ala Pro Leu Gly
1 5 10 15

Val Ala Leu Leu Gln Ala Leu Arg Asp Met Pro Glu Val Glu Thr His
20 25 30

Leu Val Met Ser Lys Trp Ala Lys Thr Thr Ile Glu Leu Glu Thr Pro
35 40 45

Trp Thr Ala Arg Glu Val Ala Ala Leu Ala Asp Phe Ser His Ser Pro
50 55 60

Ala Asp Gln Ala Ala Thr Ile Ser Ser Gly Ser Phe Arg Thr Asp Gly

65 70 75 80

Met Ile Val Ile Pro Cys Ser Met Lys Thr Leu Ala Gly Ile Arg Ala
85 90 95

Gly Tyr Ala Glu Gly Leu Val Gly Arg Ala Ala Asp Val Val Leu Lys
100 105 110

Glu Gly Arg Lys Leu Val Leu Val Pro Arg Glu Met Pro Leu Ser Thr
115 120 125

Ile His Leu Glu Asn Met Leu Ala Leu Ser Arg Met Gly Val Ala Met
130 135 140

Val Pro Pro Met Pro Ala Tyr Tyr Asn His Pro Glu Thr Val Asp Asp
145 150 155 160

Ile Thr Asn His Ile Val Thr Arg Val Leu Asp Gln Phe Gly Leu Asp
165 170 175

Tyr His Lys Ala Arg Arg Trp Asn Gly Leu Arg Thr Ala Glu Gln Phe
180 185 190

Ala Gln Glu Ile Glu
195

<210> 44
<211> 570
<212> DNA
<213> Escherichia coli

<220>
<221> gene
<222> (1)..(570)
<223> Nucleotide sequence of Escherichia coli ubiX gene

<400> 44
atgaaacgac tcattgtagg catcagcggt gccagcggcg cgatttatgg cgtgcgctta 60

ttacaggttc tgcgcgatgt cgcagatatc gaaacgcatc tggtgatgag ccaggcggcg 120

cgccagacct tatccctcga aacgggtttt tccctgcgcg aagtgcaggc attagctgat 180

gtcacgcacg atgcgcgcga tattgccgcc agcatctctt ccggttcttt ccagacgctg 240

gggatggtta ttttaccctg ttcaatcaaa acccttttccg gcattgtcca tagctacacc 300

gatggtttac tgacccgtgc ggcagatgtg gtgctgaaag agcgtcgccc gttggtgctc 360

tgcgtgcgtg aaacaccatt gcacttaggc catctgcgtt taatgactca ggcagcagaa 420

atcggtgcgg tgattatgcc tcccgttccg gcgttttatc atcgcccaca gtcccttgat 480

gatgtgataa atcagacggt taatcgtgtt cttgaccagt ttgcgataac ccttcctgaa 540

gatctctttg cccgctggca gggcgcataa 570

<210> 45
<211> 189
<212> PRT
<213> Escherichia coli

<220>
<221> PEPTIDE
<222> (1)..(189)

<400> 45

Met Lys Arg Leu Ile Val Gly Ile Ser Gly Ala Ser Gly Ala Ile Tyr
1 5 10 15

Gly Val Arg Leu Leu Gln Val Leu Arg Asp Val Ala Asp Ile Glu Thr
20 25 30

His Leu Val Met Ser Gln Ala Ala Arg Gln Thr Leu Ser Leu Glu Thr
35 40 45

Gly Phe Ser Leu Arg Glu Val Gln Ala Leu Ala Asp Val Thr His Asp

50 55 60

Ala Arg Asp Ile Ala Ala Ser Ile Ser Ser Gly Ser Phe Gln Thr Leu
65 70 75 80

Gly Met Val Ile Leu Pro Cys Ser Ile Lys Thr Leu Ser Gly Ile Val
85 90 95

His Ser Tyr Thr Asp Gly Leu Leu Thr Arg Ala Ala Asp Val Val Leu
100 105 110

Lys Glu Arg Arg Pro Leu Val Leu Cys Val Arg Glu Thr Pro Leu His
115 120 125

Leu Gly His Leu Arg Leu Met Thr Gln Ala Ala Glu Ile Gly Ala Val
130 135 140

Ile Met Pro Pro Val Pro Ala Phe Tyr His Arg Pro Gln Ser Leu Asp
145 150 155 160

Asp Val Ile Asn Gln Thr Val Asn Arg Val Leu Asp Gln Phe Ala Ile
165 170 175

Thr Leu Pro Glu Asp Leu Phe Ala Arg Trp Gln Gly Ala
180 185

<210> 46
<211> 594
<212> DNA
<213> Escherichia coli

<220>
<221> gene
<222> (1)..(594)
<223> Nucleotide sequence of Escherichia coli Wstrain elw gene

<400> 46
atgaaactga tcgtcgggat gacaggggct accggtgcgc ctcttggtgt ggcattactg 60

caagcgctgc gggagatgcc gaatgtcgag actcatctgg tgatgtcgaa gtgggcgaaa 120

accaccattg aactggaaac gccttacagc gctcgcgatg ttgctgccct cgcagacttc 180

agccataacc cggcggatca ggcggcgatc atctcatccg gttcttttcg taccgacggc 240

atgatcgtta ttccgtgcag tatgaaaacg ctcgccggta tccgcgctgg ttacgccgat 300

ggcctggtag ggcgcgcggc ggacgtcgtg ctcaaagaag gccgcaaact ggtgctggtg 360

ccgcgtgaaa tgccgcttag caccatccat ctcgaaaata tgctcgcact ttcacgcatg 420

ggcgtggcga tggtgccgcc gatgcctgcc ttttataacc atcccgaaac ggtagatgac 480

attgtccacc atgtggtagc ccgcgtgctg gatcaatttg gcctcgaaca tccccacgcc 540

aggcgctggc aaggattgcc gcaggcccgg aatttttctc aggagaatga ataa 594

<210> 47
<211> 197
<212> PRT
<213> Escherichia coli

<220>
<221> PEPTIDE
<222> (1)..(197)
<223> Amino acid sequence of Elw protein of Escherichia coli W strain

<400> 47

Met Lys Leu Ile Val Gly Met Thr Gly Ala Thr Gly Ala Pro Leu Gly
1 5 10 15

Val Ala Leu Leu Gln Ala Leu Arg Glu Met Pro Asn Val Glu Thr His
20 25 30

Leu Val Met Ser Lys Trp Ala Lys Thr Thr Ile Glu Leu Glu Thr Pro
35 40 45

Tyr Ser Ala Arg Asp Val Ala Ala Leu Ala Asp Phe Ser His Asn Pro
50 55 60

Ala Asp Gln Ala Ala Ile Ile Ser Ser Gly Ser Phe Arg Thr Asp Gly
65 70 75 80

Met Ile Val Ile Pro Cys Ser Met Lys Thr Leu Ala Gly Ile Arg Ala
85 90 95

Gly Tyr Ala Asp Gly Leu Val Gly Arg Ala Ala Asp Val Val Leu Lys
100 105 110

Glu Gly Arg Lys Leu Val Leu Val Pro Arg Glu Met Pro Leu Ser Thr
115 120 125

Ile His Leu Glu Asn Met Leu Ala Leu Ser Arg Met Gly Val Ala Met
130 135 140

Val Pro Pro Met Pro Ala Phe Tyr Asn His Pro Glu Thr Val Asp Asp
145 150 155 160

Ile Val His His Val Val Ala Arg Val Leu Asp Gln Phe Gly Leu Glu
165 170 175

His Pro His Ala Arg Arg Trp Gln Gly Leu Pro Gln Ala Arg Asn Phe
180 185 190

Ser Gln Glu Asn Glu
195

<210> 48
<211> 579
<212> DNA
<213> Klebsiella oxytoca

<220>
<221> gene
<222> (1)..(579)
<223> Nucleotide sequence of Klebsiella oxytoca kox gene

<400> 48
atgacggcac gcatcatcat tggtatcagc ggcgcatccg ggtttcagta cggcgttaag 60

gcgctggagc tactgcgccc gcatcccgtt gaagtccacc tggtcgtctc taaaggcgcg 120

gaaaaaacct gcgagctgga gacggatcac cgcctggacg aggtgatggc gctggccgac 180

gtggtgcatc ccatcgcgaa tcttggggcg gctatctcca gcggttcgtt taaaacgctg 240

ggaatgttga tcgcgccgtg ttcaatgcgt tctttaggcg ccatcgccca ctgcctgacc 300

gacaacctgc tcacccgcgc tgcggacgtg gtgctgaaag agcgtcgccg cctggtgctg 360

ctggcccggg aaacaccgct gaaccttggc catatccgca atatggccgc cgtaaccgaa 420

atgggcggaa ttatctttcc gccggtcccg gcactttacc agcgtccgca aacggcggac 480

gacatcgtta cccatagcgt caatcgcgcg ctcgatctgt ttgacctgca ggtcaacaac 540

atcccccgct ggggtgaagg cgagctacgt tttaattaa 579

<210> 49
<211> 192
<212> PRT
<213> Klebsiella oxytoca

<220>
<221> PEPTIDE
<222> (1)..(192)
<223> Amino acid sequence of Kox protein of Klebsiella oxytoca.

<400> 49

Met Thr Ala Arg Ile Ile Ile Gly Ile Ser Gly Ala Ser Gly Phe Gln
1 5 10 15

Tyr Gly Val Lys Ala Leu Glu Leu Leu Arg Pro His Pro Val Glu Val
20 25 30

His Leu Val Val Ser Lys Gly Ala Glu Lys Thr Cys Glu Leu Glu Thr
35 40 45

Asp His Arg Leu Asp Glu Val Met Ala Leu Ala Asp Val Val His Pro
50 55 60

Ile Ala Asn Leu Gly Ala Ala Ile Ser Ser Gly Ser Phe Lys Thr Leu
65 70 75 80

Gly Met Leu Ile Ala Pro Cys Ser Met Arg Ser Leu Gly Ala Ile Ala
85 90 95

His Cys Leu Thr Asp Asn Leu Leu Thr Arg Ala Ala Asp Val Val Leu
100 105 110

Lys Glu Arg Arg Arg Leu Val Leu Leu Ala Arg Glu Thr Pro Leu Asn
115 120 125

Leu Gly His Ile Arg Asn Met Ala Ala Val Thr Glu Met Gly Gly Ile
130 135 140

Ile Phe Pro Pro Val Pro Ala Leu Tyr Gln Arg Pro Gln Thr Ala Asp
145 150 155 160

Asp Ile Val Thr His Ser Val Asn Arg Ala Leu Asp Leu Phe Asp Leu
165 170 175

Gln Val Asn Asn Ile Pro Arg Trp Gly Glu Gly Glu Leu Arg Phe Asn
180 185 190

<210> 50
<211> 564
<212> DNA
<213> Lactobacillus plantarum

<220>
<221> gene
<222> (1)..(564)
<223> Nucleotide sequence of Lactobacillus plantarum lpl gene

<400> 50
atgaaacgaa ttgttgtggg aatcacggga gcgtccggta cgatttacgc ggtcgactta 60

ttagaaaagt tacatcagcg gccagatgtt gaagttcatc tggtaatgag tgcgtgggct 120

aaaaaaaact tggagttaga gactgattac tcgctcgcgc agctgacggc gctcgcggat 180

gctacttatc gggctaatga ccaaggcgca gcgattgcca gcggttcgtt tttgaatgac 240

ggaatggtca ttgtcccagc tagtatgaag acggtagcag ggattgcgta cggcttcggt 300

gataatttaa tatcgcgggc tgctgatgtc acgattaaag aacaacgtaa acttgtgatt 360

gttccacgtg aaacaccgtt aagcgtgatt catttagaaa atctaacgaa gttggcaaaa 420

ctcggtgccc aaattattcc accgattccc gcgttttata atcatccgca atccattcag 480

gatctggtca atcatcaaac catgaaaatt ttagatgcgt ttcatattca taatgaaact 540

gatcgccgtt gggaggggga ttaa 564

<210> 51
<211> 187
<212> PRT
<213> Lactobacillus plantarum

<220>
<221> PEPTIDE
<222> (1)..(187)
<223> Amino acid sequence of Lpl protein of Lactobacillus plantarum

<400> 51

Met Lys Arg Ile Val Val Gly Ile Thr Gly Ala Ser Gly Thr Ile Tyr
1 5 10 15

Ala Val Asp Leu Leu Glu Lys Leu His Gln Arg Pro Asp Val Glu Val
20 25 30

His Leu Val Met Ser Ala Trp Ala Lys Lys Asn Leu Glu Leu Glu Thr
35 40 45

Asp Tyr Ser Leu Ala Gln Leu Thr Ala Leu Ala Asp Ala Thr Tyr Arg
50 55 60

Ala Asn Asp Gln Gly Ala Ala Ile Ala Ser Gly Ser Phe Leu Asn Asp
65 70 75 80

Gly Met Val Ile Val Pro Ala Ser Met Lys Thr Val Ala Gly Ile Ala
85 90 95

Tyr Gly Phe Gly Asp Asn Leu Ile Ser Arg Ala Ala Asp Val Thr Ile
100 105 110

Lys Glu Gln Arg Lys Leu Val Ile Val Pro Arg Glu Thr Pro Leu Ser
115 120 125

Val Ile His Leu Glu Asn Leu Thr Lys Leu Ala Lys Leu Gly Ala Gln
130 135 140

Ile Ile Pro Pro Ile Pro Ala Phe Tyr Asn His Pro Gln Ser Ile Gln

145 150 155 160

Asp Leu Val Asn His Gln Thr Met Lys Ile Leu Asp Ala Phe His Ile
165 170 175

His Asn Glu Thr Asp Arg Arg Trp Glu Gly Asp
180 185

<210> 52
<211> 200
<212> DNA
<213> Escherichia coli

<220>
<221> promoter
<222> (1)..(200)
<223> Nucleotide sequence of Pgi promoter

<400> 52
agcggggcgg ttgtcaacga tggggtcatg cggatttttc atccactcct ggcggtcagt 60

agttcagcta ataaatgctt cactgcgcta agggtttaca ctcaacatta cgctaacggc 120

actaaaacca tcacattttt ctgtgactgg cgctacaatc ttccaaagtc acaattctca 180

tgcagaggag gaatatagcc 200

<210> 53

<211> 3537

<212> DNA

<213> Saccharomyces cerevisiae

<220>

<221> gene

<222> (1)..(3537)

<223> Nucleotide sequence of Saccharomyces cerevisiae pyc gene

<400> 53

atgtcgcaaa gaaaattcgc cggcttgaga gataacttca atctcttggg tgaaaagaac 60

aaaatattgg tggctaatag aggagaaatt ccaatcagaa tttttcgtac cgctcatgaa 120

ctgtctatgc agacggtagc tatatattct catgaagatc gtctttcaac gcacaaacaa 180

aaggctgacg aagcatacgt cataggtgaa gtaggccaat atacccccgt cggcgcttat 240

ttggccattg acgaaatcat ttccattgcc caaaaacacc aggtagattt catccatcca 300

ggttatgggt tcttgtctga aaattcggaa tttgccgaca aagtagtgaa ggccggtatc 360

acttggattg gccctccagc tgaagttatt gactccgtgg gtgataaggt ctcagctaga 420

aacctggcag caaaagctaa tgtgcccacc gttcctggta caccaggtcc tatagaaact 480

gtagaggaag cacttgactt cgtcaatgaa tacggctacc cggtgatcat taaggccgcc 540

tttggtggtg gtggtagagg tatgagagtc gttagagaag gtgacgacgt ggcagatgcc 600

tttcaacgtg ctacctccga agcccgtact gccttcggta atggtacctg ctttgtggaa 660

agattcttgg acaagccaaa gcatattgaa gttcaattgt tggccgataa ccacggaaac 720

gtggttcatc ttttcgaaag agactgttcc gtgcagagaa gacaccaaaa ggttgtcgaa 780

gtggccccag caaagacttt accccgtgaa gtccgtgacg ccattttgac agatgcagtt 840

aaattggcca aagagtgtgg ctacagaaat gcgggtactg ctgaattctt ggttgataac 900

caaaatagac actatttcat tgaaattaat ccaagaatcc aagtggaaca taccatcaca 960

gaagaaatta ccggtataga tattgtggcg gctcagatcc aaattgcggc aggtgcctct 1020

ctaccccagc tgggcctatt ccaggacaaa attacgactc gtggctttgc cattcagtgc 1080

cgtattacca cggaagaccc tgctaagaac ttccaaccag ataccggtag aatagaagtg 1140

taccgttctg caggtggtaa tggtgttaga ctggatggtg gtaacgccta tgcaggaaca 1200

ataatctcac ctcattacga ctcaatgctg gtcaaatgct catgctccgg ttccacctac 1260

gaaatcgttc gtagaaaaat gattcgtgca ttaatcgagt tcagaattag aggtgtcaag 1320

accaacattc ccttcctatt gactcttttg accaatccag tatttattga gggtacatac 1380

tggacgactt ttattgacga caccccacaa ctgttccaaa tggtttcatc acaaaacaga 1440

gcccaaaaac ttttacatta cctcgccgac gtggcagtca atggttcatc tatcaagggt 1500

caaattggct tgccaaaatt aaaatcaaat ccaagtgtcc cccatttgca cgatgctcag 1560

ggcaatgtca tcaacgttac aaagtctgca ccaccatccg gatggaggca agtgctacta 1620

gaaaaggggc cagctgaatt tgccagacaa gttagacagt tcaatggtac tttattgatg 1680

gacaccacct ggagagacgc tcatcaatct ctacttgcaa caagagtcag aacccacgat 1740

ttggctacaa tcgctccaac aaccgcacat gcccttgcag gtcgtttcgc cttagaatgt 1800

tggggtggtg ccacattcga tgttgcaatg agatttttgc atgaggatcc atgggaacgt 1860

ttgagaaaat taagatctct ggtgcctaat attccattcc aaatgttatt gcgtggtgcc 1920

aatggtgtgg cttattcttc attgcctgac aatgctattg accatttcgt caagcaagcc 1980

aaggataatg gtgttgatat atttagagtc tttgatgcct taaatgactt ggaacaattg 2040

aaggtcggtg tagatgctgt gaagaaggca ggtggtgttg tagaagccac tgtttgtttc 2100

tctggggata tgcttcagcc aggcaagaaa tacaatttgg attactactt ggaaattgct 2160

gaaaaaattg tccaaatggg cactcatatc ctgggtatca aagatatggc aggtaccatg 2220

aagccagcag ctgccaaact actgattgga tctttgaggg ctaagtaccc tgatctccca 2280

atacatgttc acactcacga ttctgcaggt actgctgttg catcaatgac tgcgtgtgct 2340

ctggcgggcg ccgatgtcgt tgatgttgcc atcaactcaa tgtctggttt aacttcacaa 2400

ccatcaatca atgctctgtt ggcttcatta gaaggtaata ttgacactgg tattaacgtt 2460

gagcatgtcc gtgaactaga tgcatattgg gcagagatga gattgttata ctcttgtttc 2520

gaggctgact tgaagggccc agatccagaa gtttatcaac atgaaatccc aggtggtcaa 2580

ttgacaaact tgttgtttca agcccaacaa ttgggtcttg gagaacaatg ggccgaaaca 2640

aaaagagctt acagagaagc caattattta ttgggtgata ttgtcaaagt taccccaact 2700

tcgaaggtcg ttggtgatct ggcacaattt atggtctcca ataaattaac ttccgatgat 2760

gtgagacgcc tggctaattc tttggatttc cctgactctg ttatggattt cttcgaaggc 2820

ttaatcggcc aaccatatgg tgggttccca gaaccattta gatcagacgt tttaaggaac 2880

aagagaagaa agttgacttg tcgtccaggc ctggaactag agccatttga tctcgaaaaa 2940

attagagaag acttgcagaa tagatttggt gatgttgatg agtgcgacgt tgcttcttat 3000

aacatgtacc caagagttta tgaagacttc caaaagatga gagaaacgta tggtgattta 3060

tctgtattgc caacaagaag ctttttgtct ccactagaga ctgacgaaga aattgaagtt 3120

gtaatcgaac aaggtaaaac gctaattatc aagctacagg ctgtgggtga tttgaacaaa 3180

aagaccggtg aaagagaagt ttactttgat ttgaatggtg aaatgagaaa aattcgtgtt 3240

gctgacagat cacaaaaagt ggaaactgtt actaaatcca aagcagacat gcatgatcca 3300

ttacacattg gtgcaccaat ggcaggtgtc attgttgaag ttaaagttca taaaggatca 3360

ctaataaaga agggccaacc tgtagccgta ttaagcgcca tgaaaatgga aatgattata 3420

tcttctccat ccgatggaca agttaaagaa gtgtttgtct ctgatggtga aaatgtggac 3480

tcttctgatt tattagttct attagaagac caagttcctg ttgaaactaa ggcatga 3537

<210> 54
<211> 1178
<212> PRT
<213> Escherichia coli

<220>
<221> PEPTIDE
<222> (1)..(1178)
<223> Amino acid sequence of Pyc protein of Saccharomyces cerevisiae

<400> 54

Met Ser Gln Arg Lys Phe Ala Gly Leu Arg Asp Asn Phe Asn Leu Leu
1 5 10 15

Gly Glu Lys Asn Lys Ile Leu Val Ala Asn Arg Gly Glu Ile Pro Ile
20 25 30

Arg Ile Phe Arg Thr Ala His Glu Leu Ser Met Gln Thr Val Ala Ile
35 40 45

Tyr Ser His Glu Asp Arg Leu Ser Thr His Lys Gln Lys Ala Asp Glu
50 55 60

Ala Tyr Val Ile Gly Glu Val Gly Gln Tyr Thr Pro Val Gly Ala Tyr
65 70 75 80

Leu Ala Ile Asp Glu Ile Ile Ser Ile Ala Gln Lys His Gln Val Asp
85 90 95

Phe Ile His Pro Gly Tyr Gly Phe Leu Ser Glu Asn Ser Glu Phe Ala
100 105 110

Asp Lys Val Val Lys Ala Gly Ile Thr Trp Ile Gly Pro Pro Ala Glu
115 120 125

Val Ile Asp Ser Val Gly Asp Lys Val Ser Ala Arg Asn Leu Ala Ala
130 135 140

Lys Ala Asn Val Pro Thr Val Pro Gly Thr Pro Gly Pro Ile Glu Thr
145 150 155 160

Val Glu Glu Ala Leu Asp Phe Val Asn Glu Tyr Gly Tyr Pro Val Ile

165 170 175

Ile Lys Ala Ala Phe Gly Gly Gly Gly Arg Gly Met Arg Val Val Arg
180 185 190

Glu Gly Asp Asp Val Ala Asp Ala Phe Gln Arg Ala Thr Ser Glu Ala
195 200 205

Arg Thr Ala Phe Gly Asn Gly Thr Cys Phe Val Glu Arg Phe Leu Asp
210 215 220

Lys Pro Lys His Ile Glu Val Gln Leu Leu Ala Asp Asn His Gly Asn
225 230 235 240

Val Val His Leu Phe Glu Arg Asp Cys Ser Val Gln Arg Arg His Gln
245 250 255

Lys Val Val Glu Val Ala Pro Ala Lys Thr Leu Pro Arg Glu Val Arg
260 265 270

Asp Ala Ile Leu Thr Asp Ala Val Lys Leu Ala Lys Glu Cys Gly Tyr
275 280 285

Arg Asn Ala Gly Thr Ala Glu Phe Leu Val Asp Asn Gln Asn Arg His
290 295 300

Tyr Phe Ile Glu Ile Asn Pro Arg Ile Gln Val Glu His Thr Ile Thr
305 310 315 320

Glu Glu Ile Thr Gly Ile Asp Ile Val Ala Ala Gln Ile Gln Ile Ala
325 330 335

Ala Gly Ala Ser Leu Pro Gln Leu Gly Leu Phe Gln Asp Lys Ile Thr
340 345 350

Thr Arg Gly Phe Ala Ile Gln Cys Arg Ile Thr Thr Glu Asp Pro Ala
355 360 365

Lys Asn Phe Gln Pro Asp Thr Gly Arg Ile Glu Val Tyr Arg Ser Ala
370 375 380

Gly Gly Asn Gly Val Arg Leu Asp Gly Gly Asn Ala Tyr Ala Gly Thr
385 390 395 400

Ile Ile Ser Pro His Tyr Asp Ser Met Leu Val Lys Cys Ser Cys Ser
405 410 415

Gly Ser Thr Tyr Glu Ile Val Arg Arg Lys Met Ile Arg Ala Leu Ile
420 425 430

Glu Phe Arg Ile Arg Gly Val Lys Thr Asn Ile Pro Phe Leu Leu Thr
435 440 445

Leu Leu Thr Asn Pro Val Phe Ile Glu Gly Thr Tyr Trp Thr Thr Phe
450 455 460

Ile Asp Asp Thr Pro Gln Leu Phe Gln Met Val Ser Ser Gln Asn Arg
465 470 475 480

Ala Gln Lys Leu Leu His Tyr Leu Ala Asp Val Ala Val Asn Gly Ser
485 490 495

Ser Ile Lys Gly Gln Ile Gly Leu Pro Lys Leu Lys Ser Asn Pro Ser
500 505 510

Val Pro His Leu His Asp Ala Gln Gly Asn Val Ile Asn Val Thr Lys
515 520 525

Ser Ala Pro Pro Ser Gly Trp Arg Gln Val Leu Leu Glu Lys Gly Pro
530 535 540

Ala Glu Phe Ala Arg Gln Val Arg Gln Phe Asn Gly Thr Leu Leu Met
545 550 555 560

Asp Thr Thr Trp Arg Asp Ala His Gln Ser Leu Leu Ala Thr Arg Val
565 570 575

Arg Thr His Asp Leu Ala Thr Ile Ala Pro Thr Thr Ala His Ala Leu
580 585 590

Ala Gly Arg Phe Ala Leu Glu Cys Trp Gly Gly Ala Thr Phe Asp Val
595 600 605

Ala Met Arg Phe Leu His Glu Asp Pro Trp Glu Arg Leu Arg Lys Leu
610 615 620

Arg Ser Leu Val Pro Asn Ile Pro Phe Gln Met Leu Leu Arg Gly Ala
625 630 635 640

Asn Gly Val Ala Tyr Ser Ser Leu Pro Asp Asn Ala Ile Asp His Phe
645 650 655

Val Lys Gln Ala Lys Asp Asn Gly Val Asp Ile Phe Arg Val Phe Asp

660 665 670

Ala Leu Asn Asp Leu Glu Gln Leu Lys Val Gly Val Asp Ala Val Lys
675 680 685

Lys Ala Gly Gly Val Val Glu Ala Thr Val Cys Phe Ser Gly Asp Met
690 695 700

Leu Gln Pro Gly Lys Lys Tyr Asn Leu Asp Tyr Tyr Leu Glu Ile Ala
705 710 715 720

Glu Lys Ile Val Gln Met Gly Thr His Ile Leu Gly Ile Lys Asp Met
725 730 735

Ala Gly Thr Met Lys Pro Ala Ala Ala Lys Leu Leu Ile Gly Ser Leu
740 745 750

Arg Ala Lys Tyr Pro Asp Leu Pro Ile His Val His Thr His Asp Ser
755 760 765

Ala Gly Thr Ala Val Ala Ser Met Thr Ala Cys Ala Leu Ala Gly Ala
770 775 780

Asp Val Val Asp Val Ala Ile Asn Ser Met Ser Gly Leu Thr Ser Gln
785 790 795 800

Pro Ser Ile Asn Ala Leu Leu Ala Ser Leu Glu Gly Asn Ile Asp Thr
805 810 815

Gly Ile Asn Val Glu His Val Arg Glu Leu Asp Ala Tyr Trp Ala Glu
820 825 830

Met Arg Leu Leu Tyr Ser Cys Phe Glu Ala Asp Leu Lys Gly Pro Asp
835 840 845

Pro Glu Val Tyr Gln His Glu Ile Pro Gly Gly Gln Leu Thr Asn Leu
850 855 860

Leu Phe Gln Ala Gln Gln Leu Gly Leu Gly Glu Gln Trp Ala Glu Thr
865 870 875 880

Lys Arg Ala Tyr Arg Glu Ala Asn Tyr Leu Leu Gly Asp Ile Val Lys
885 890 895

Val Thr Pro Thr Ser Lys Val Val Gly Asp Leu Ala Gln Phe Met Val
900 905 910

Ser Asn Lys Leu Thr Ser Asp Asp Val Arg Arg Leu Ala Asn Ser Leu
915 920 925

Asp Phe Pro Asp Ser Val Met Asp Phe Phe Glu Gly Leu Ile Gly Gln
930 935 940

Pro Tyr Gly Gly Phe Pro Glu Pro Phe Arg Ser Asp Val Leu Arg Asn
945 950 955 960

Lys Arg Arg Lys Leu Thr Cys Arg Pro Gly Leu Glu Leu Glu Pro Phe
965 970 975

Asp Leu Glu Lys Ile Arg Glu Asp Leu Gln Asn Arg Phe Gly Asp Val
980 985 990

Asp Glu Cys Asp Val Ala Ser Tyr Asn Met Tyr Pro Arg Val Tyr Glu
995 1000 1005

Asp Phe Gln Lys Met Arg Glu Thr Tyr Gly Asp Leu Ser Val Leu
1010 1015 1020

Pro Thr Arg Ser Phe Leu Ser Pro Leu Glu Thr Asp Glu Glu Ile
1025 1030 1035

Glu Val Val Ile Glu Gln Gly Lys Thr Leu Ile Ile Lys Leu Gln
1040 1045 1050

Ala Val Gly Asp Leu Asn Lys Lys Thr Gly Glu Arg Glu Val Tyr
1055 1060 1065

Phe Asp Leu Asn Gly Glu Met Arg Lys Ile Arg Val Ala Asp Arg
1070 1075 1080

Ser Gln Lys Val Glu Thr Val Thr Lys Ser Lys Ala Asp Met His
1085 1090 1095

Asp Pro Leu His Ile Gly Ala Pro Met Ala Gly Val Ile Val Glu
1100 1105 1110

Val Lys Val His Lys Gly Ser Leu Ile Lys Lys Gly Gln Pro Val
1115 1120 1125

Ala Val Leu Ser Ala Met Lys Met Glu Met Ile Ile Ser Ser Pro
1130 1135 1140

Ser Asp Gly Gln Val Lys Glu Val Phe Val Ser Asp Gly Glu Asn

1145 1150 1155

Val Asp Ser Ser Asp Leu Leu Val Leu Leu Glu Asp Gln Val Pro
1160 1165 1170

Val Glu Thr Lys Ala
1175

<210> 55
<211> 6273
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(6273)
<223> DNA sequence of the plasmid pCAT350

<400> 55
tgaatgacct ttaatagatt atattactaa ttaattgggg accctagagg tccccttttt 60

tattttaaaa attttttcac aaaacggttt acaagcatac gttggccgat tcattaatgc 120

agctggcacg acaggtttcc cgactggaaa gcgggcagtg agcgcaacgc aattaatgtg 180

agttagctca ctcattaggc accccaggct ttacacttta tgcttccggc tcgtatgttg 240

tgtggaattg tgagcggata acaatttcac acaggaaaca gctatgacca tgattacgcc 300

aagcttgcat gcctgcaggt cgactctaga ggatccccgg gtaccgagct cgaattcact 360

ggccgtcgtt ttacaacgtc gtgactggga aaaccctggc gttacccaac ttaatcgcct 420

tgcagcacat ccccctttcg ccagctggcg taatagcgaa gaggcccgca ccgatcgccc 480

ttcccaacag ttgcgcagcc tgaatggcga atggcgcctg atgcggtatt ttctccttac 540

gcatctgtgc ggtatttcac accgcatatg gtgcactctc agtacaatct gctctgatgc 600

cgcatagtta agccagcccc gacacccgcc aacacccgct gacgaattcg ttgacagtaa 660

gacgggtaag cctgttgatg ataccgctgc cttactgggt gcattagcca gtctgaatga 720

cctgtcacgg gataatccga agtggtcaga ctggaaaatc agagggcagg aactgctgaa 780

cagcaaaaag tcagatagca ccacatagca gacccgccat aaaacgccct gagaagcccg 840

tgacgggctt ttcttgtatt atgggtagtt tccttgcatg aatccataaa aggcgcctgt 900

agtgccattt acccccattc actgccagag ccgtgagcgc agcgaactga atgtcacgaa 960

aaagacagcg actcaggtgc ctgatggtcg gagacaaaag gaatattcag cgatttgccc 1020

gagcttgcga gggtgctact taagccttta gggttttaag gtctgttttg tagaggagca 1080

aacagcgttt gcgacatcct tttgtaatac tgcggaactg actaaagtag tgagttatac 1140

acagggctgg gatctattct ttttatcttt ttttattctt tctttattct ataaattata 1200

accacttgaa tataaacaaa aaaaacacac aaaggtctag cggaatttac agagggtcta 1260

gcagaattta caagttttcc agcaaaggtc tagcagaatt tacagatacc cacaactcaa 1320

aggaaaagga ctagtaatta tcattgacta gcccatctca attggtatag tgattaaaat 1380

cacctagacc aattgagatg tatgtctgaa ttagttgttt tcaaagcaaa tgaactagcg 1440

attagtcgct atgacttaac ggagcatgaa accaagctaa ttttatgctg tgtggcacta 1500

ctcaacccca cgattgaaaa ccctacaagg aaagaacgga cggtatcgtt cacttataac 1560

caatacgctc agatgatgaa catcagtagg gaaaatgctt atggtgtatt agctaaagca 1620

accagagagc tgatgacgag aactgtggaa atcaggaatc ctttggttaa aggctttgag 1680

attttccagt ggacaaacta tgccaagttc tcaagcgaaa aattagaatt agtttttagt 1740

gaagagatat tgccttatct tttccagtta aaaaaattca taaaatataa tctggaacat 1800

gttaagtctt ttgaaaacaa atactctatg aggatttatg agtggttatt aaaagaacta 1860

acacaaaaga aaactcacaa ggcaaatata gagattagcc ttgatgaatt taagttcatg 1920

ttaatgcttg aaaataacta ccatgagttt aaaaggctta accaatgggt tttgaaacca 1980

ataagtaaag atttaaacac ttacagcaat atgaaattgg tggttgataa gcgaggccgc 2040

ccgactgata cgttgatttt ccaagttgaa ctagatagac aaatggatct cgtaaccgaa 2100

cttgagaaca accagataaa aatgaatggt gacaaaatac caacaaccat tacatcagat 2160

tcctacctac gtaacggact aagaaaaaca ctacacgatg ctttaactgc aaaaattcag 2220

ctcaccagtt ttgaggcaaa atttttgagt gacatgcaaa gtaagcatga tctcaatggt 2280

tcgttctcat ggctcacgca aaaacaacga accacactag agaacatact ggctaaatac 2340

ggaaggatct gaggttctta tggcaaacac ggacgccgca aacggcgtcc gaatttcttg 2400

gtcgaccgtt aaatctatca ccgcaaggga taaatatcta acaccgtgcg tgttgactat 2460

tttacctctg gcggtgataa tggttgcatg tactaatcta gataaggaat atagccatgg 2520

aagtgaaaat cttcaacacc caggatgttc aggatttttct gcgtgttgca agcggtctgg 2580

aacaagaggg tggtaatccg cgtgttaaac aaattattca tcgtgttctg agcgacctgt 2640

ataaagcaat tgaagatctg aatatcacca gcgacgaata ttgggcaggc gttgcatatc 2700

tgaatcagct gggtgcaaat caagaagcag gtctgctgag tccgggtctg ggttttgatc 2760

attatctgga tatgcgtatg gatgcagaag atgcagcact gggtattgaa aatgcaacac 2820

cgcgtaccat tgaaggtccg ctgtatgttg cgggtgcacc ggaaagcgtt ggttatgcac 2880

gcatggatga tggtagcgat ccgaatggtc ataccctgat tctgcatggc accatttttg 2940

atgcagatgg taaaccgctg ccgaatgcaa aagttgaaat ttggcatgca aacaccaaag 3000

gcttttatag ccattttgat ccgaccggtg aacagcaggc ctttaatatg cgtcgtagca 3060

ttattaccga tgagaatggt cagtatcgtg ttcgtaccat tctgcctgcc ggttatggtt 3120

gtcctccgga aggtccgacc cagcaactgc tgaaccaact gggtcgtcat ggtaatcgtc 3180

cggcacatat tcattatttt gttagcgcag atggtcaccg taaactgacc acccagatta 3240

atgttgccgg tgatccgtat acctatgatg attttgcata tgccacccgt gaaggtctgg 3300

ttgttgatgc agttgaacat accgatccgg aagcaattaa agccaatgat gtggaaggtc 3360

cttttgccga aatggtgttt gatctgaaac tgacccgtct ggttgatggt gttgataatc 3420

aggttgtgga tcgtccgcgt ctggcagttt aatacaccaa aatggttcaa aattatcagg 3480

cgagtgatca tgatcactgg cctgttttta tttcagggaa gggtggagac aattacgtgg 3540

ataatcagat catccaagaa accgtggata aaattctgag cgttctgccg aatcaggcag 3600

gtcagctggc acgtctggtg cgtctgatgc aatttgcatg cgatccgacc attaccgtta 3660

ttggcaaata taaccatggt aaaagccgtc tgctgaatga actgattggc accgatatct 3720

ttagcgttgc agataaacgt gaaaccattc agctggccga acataaacag gatcaggttc 3780

gttggctgga tgcacctggt ctggatgccg atgttgcagc agttgatgat cgtcatgcat 3840

ttgaagcagt ttggacccag gcagatattc gtctgtttgt tcatagcgtt cgtgaaggtg 3900

aactggatgc aaccgaacac catctgctgc aacagctgat tgaagatgcc gatcatagcc 3960

gtcgtcagac cattctggtt ctgacccaga ttgatcagat tccggatcag accatcctga 4020

cacagattaa aaccagcatt gcacagcagg ttccgaaact ggatatttgg gcagttagcg 4080

caacccgtca tcgtcagggc attgaaaacg gtaaaaccct gctgatcgaa aaaagcggta 4140

ttggtgcact gcgccatacc ctggaacagg cactggcaca ggtgccgagc gcacgtacct 4200

atgaaaaaaa tcgtctgctg tcagatctgc accatcagct gaaacaactg ctgctggatc 4260

agaaacatgt tctgcaacaa ctgcaacaga cacagcaaca gcagctgcat gattttgata 4320

ccggtctgat taacattctg gacaaaattc gtgttgatct ggaaccgatt gtgaatattg 4380

atggtcagga tcaagcactg aatccggata gctttgcaac catgtttaaa aacaccgcag 4440

caaaacagca gcgtgccaaa gttcagattg catatagccg tgcatgcatt gaaatcaaca 4500

gccatctgat tcgccatggt gttgttggtc tgcctgcgga acagcagacc accattaaaa 4560

gcattgatac cgtgattgtt gccgtgtttg gtatcagcgt taaatttcgt gatcagctgc 4620

gtgccctgtt ttataccgat accgaacgtc agcgtctgca acgtgaattt cgtttctatt 4680

ttgaaaaaag tgccggtcgc atgattctgg cagcaaaaat tgaacagacc atgcgtcagc 4740

agggctgtat tcagaatgcc atgatggcac tgcaacaaat ggaaagcgca gcataagtct 4800

gacaggtgcc ggatttcata tccggcactt actttcctta actcttcgcc ttaacgcaaa 4860

atctcacact gatgatcctg aatttcctcg gctgaagcac ggttaagcgt cagtagattt 4920

cgttgtgtcg ccagcaatac aaatgatgga cataagcctg ttcggttcgt aagctgtaat 4980

gcaagtagcg tatgcgctca cgcaactggt ccagaacctt gaccgaacgc agcggtggta 5040

acggcgcagt ggcggttttc atggcttgtt atgactgttt ttttggggta cagtctatgc 5100

ctcgggcatc caagcagcaa gcgcgttacg ccgtgggtcg atgtttgatg ttatggagca 5160

gcaacgatgt tacgcagcag ggcagtcgcc ctaaaacaaa gttaaacatc atgagggaag 5220

cggtgatcgc cgaagtatcg actcaactat cagaggtagt tggcgtcatc gagcgccatc 5280

tcgaaccgac gttgctggcc gtacatttgt acggctccgc agtggatggc ggcctgaagc 5340

cacacagtga tattgatttg ctggttacgg tgaccgtaag gcttgatgaa acaacgcggc 5400

gagctttgat caacgacctt ttggaaactt cggcttcccc tggagagagc gagattctcc 5460

gcgctgtaga agtcaccatt gttgtgcacg acgacatcat tccgtggcgt tatccagcta 5520

agcgcgaact gcaatttgga gaatggcagc gcaatgacat tcttgcaggt atcttcgagc 5580

cagccacgat cgacattgat ctggctatct tgctgacaaa agcaagagaa catagcgttg 5640

ccttggtagg tccagcggcg gaggaactct ttgatccggt tcctgaacag gatctatttg 5700

aggcgctaaa tgaaacctta acgctatgga actcgccgcc cgactgggct ggcgatgagc 5760

gaaatgtagt gcttacgttg tcccgcattt ggtacagcgc agtaaccggc aaaatcgcgc 5820

cgaaggatgt cgctgccgac tgggcaatgg agcgcctgcc ggcccagtat cagcccgtca 5880

tacttgaagc tagacaggct tatcttggac aagaagaaga tcgcttggcc tcgcgcgcag 5940

atcagttgga agaatttgtc cactacgtga aaggcgagat caccaaggta gtcggcaaat 6000

aatgtctaac aattcgttca agccgacgcc gcttcgcggc gcggcttaac tcaagcgtta 6060

gatgcactaa gcacataatt gctcacagcc aaactatcag gtcaagtctg cttttattat 6120

ttttaagcgt gcataataag ccctacacaa attgggagat atatcatgaa aggctggctt 6180

tttcttgtta tcgcaatagt tggcgaagta atcgcaacat ccgcattaaa atctagcgag 6240

ggctttacta agctgatccg gtggatgacc ttt 6273

<210> 56
<211> 3943
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(3943)
<223> DNA sequence of the plasmid pCP165

<400> 56
tgaatgacct ttaatagatt atattactaa ttaattgggg accctagagg tccccttttt 60

tattttaaaa atttttcac aaaacggttt acaagcatac gttggccgat tcattaatgc 120

agctggcacg acaggtttcc cgactggaaa gcgggcagtg agcgcaacgc aattaatgtg 180

agttagctca ctcattaggc accccaggct ttacacttta tgcttccggc tcgtatgttg 240

tgtggaattg tgagcggata acaatttcac acaggaaaca gctatgacca tgattacgcc 300

aagcttgcat gcctgcaggt cgactctaga ggatccccgg gtaccgagct cgaattcact 360

ggccgtcgtt ttacaacgtc gtgactggga aaaccctggc gttacccaac ttaatcgcct 420

tgcagcacat ccccctttcg ccagctggcg taatagcgaa gaggcccgca ccgatcgccc 480

ttcccaacag ttgcgcagcc tgaatggcga atggcgcctg atgcggtatt ttctccttac 540

gcatctgtgc ggtatttcac accgcatatg gtgcactctc agtacaatct gctctgatgc 600

cgcatagtta agccagcccc gacacccgcc aacacccgct gacgaattcg ttgacagtaa 660

gacgggtaag cctgttgatg ataccgctgc cttactgggt gcattagcca gtctgaatga 720

cctgtcacgg gataatccga agtggtcaga ctggaaaatc agagggcagg aactgctgaa 780

cagcaaaaag tcagatagca ccacatagca gacccgccat aaaacgccct gagaagcccg 840

tgacgggctt ttcttgtatt atgggtagtt tccttgcatg aatccataaa aggcgcctgt 900

agtgccattt acccccattc actgccagag ccgtgagcgc agcgaactga atgtcacgaa 960

aaagacagcg actcaggtgc ctgatggtcg gagacaaaag gaatattcag cgatttgccc 1020

gagcttgcga gggtgctact taagccttta gggttttaag gtctgttttg tagaggagca 1080

aacagcgttt gcgacatcct tttgtaatac tgcggaactg actaaagtag tgagttatac 1140

acagggctgg gatctattct ttttatcttt ttttattctt tctttattct ataaattata 1200

accacttgaa tataaacaaa aaaaacacac aaaggtctag cggaatttac agagggtcta 1260

gcagaattta caagttttcc agcaaaggtc tagcagaatt tacagatacc cacaactcaa 1320

aggaaaagga ctagtaatta tcattgacta gcccatctca attggtatag tgattaaaat 1380

cacctagacc aattgagatg tatgtctgaa ttagttgttt tcaaagcaaa tgaactagcg 1440

attagtcgct atgacttaac ggagcatgaa accaagctaa ttttatgctg tgtggcacta 1500

ctcaacccca cgattgaaaa ccctacaagg aaagaacgga cggtatcgtt cacttataac 1560

caatacgctc agatgatgaa catcagtagg gaaaatgctt atggtgtatt agctaaagca 1620

accagagagc tgatgacgag aactgtggaa atcaggaatc ctttggttaa aggctttgag 1680

attttccagt ggacaaacta tgccaagttc tcaagcgaaa aattagaatt agtttttagt 1740

gaagagatat tgccttatct tttccagtta aaaaaattca taaaatataa tctggaacat 1800

gttaagtctt ttgaaaacaa atactctatg aggatttatg agtggttatt aaaagaacta 1860

acacaaaaga aaactcacaa ggcaaatata gagattagcc ttgatgaatt taagttcatg 1920

ttaatgcttg aaaataacta ccatgagttt aaaaggctta accaatgggt tttgaaacca 1980

ataagtaaag atttaaacac ttacagcaat atgaaattgg tggttgataa gcgaggccgc 2040

ccgactgata cgttgatttt ccaagttgaa ctagatagac aaatggatct cgtaaccgaa 2100

cttgagaaca accagataaa aatgaatggt gacaaaatac caacaaccat tacatcagat 2160

tcctacctac gtaacggact aagaaaaaca ctacacgatg ctttaactgc aaaaattcag 2220

ctcaccagtt ttgaggcaaa atttttgagt gacatgcaaa gtaagcatga tctcaatggt 2280

tcgttctcat ggctcacgca aaaacaacga accacactag agaacatact ggctaaatac 2340

ggaaggatct gaggttctta tggcaaacac ggacgccgca aacggcgtcc gaatttcttg 2400

gtcgaccgtt aaatctatca ccgcaaggga taaatatcta acaccgtgcg tgttgactat 2460

tttacctctg gcggtgataa tggttgcatg tactaatcta gataaggaat atagccttag 2520

atttgactga aatcgtacag taaaaagcgt acaataaagg ctccacgaaa gtggggcctt 2580

ttttagcgcg agagcctttt ttgtcagcta tctatatgga cataagcctg ttcggttcgt 2640

aagctgtaat gcaagtagcg tatgcgctca cgcaactggt ccagaacctt gaccgaacgc 2700

agcggtggta acggcgcagt ggcggttttc atggcttgtt atgactgttt ttttggggta 2760

cagtctatgc ctcgggcatc caagcagcaa gcgcgttacg ccgtgggtcg atgtttgatg 2820

ttatggagca gcaacgatgt tacgcagcag ggcagtcgcc ctaaaacaaa gttaaacatc 2880

atgagggaag cggtgatcgc cgaagtatcg actcaactat cagaggtagt tggcgtcatc 2940

gagcgccatc tcgaaccgac gttgctggcc gtacatttgt acggctccgc agtggatggc 3000

ggcctgaagc cacacagtga tattgatttg ctggttacgg tgaccgtaag gcttgatgaa 3060

acaacgcggc gagctttgat caacgacctt ttggaaactt cggcttcccc tggagagagc 3120

gagattctcc gcgctgtaga agtcaccatt gttgtgcacg acgacatcat tccgtggcgt 3180

tatccagcta agcgcgaact gcaatttgga gaatggcagc gcaatgacat tcttgcaggt 3240

atcttcgagc cagccacgat cgacattgat ctggctatct tgctgacaaa agcaagagaa 3300

catagcgttg ccttggtagg tccagcggcg gaggaactct ttgatccggt tcctgaacag 3360

gatctatttg aggcgctaaa tgaaacctta acgctatgga actcgccgcc cgactgggct 3420

ggcgatgagc gaaatgtagt gcttacgttg tcccgcattt ggtacagcgc agtaaccggc 3480

aaaatcgcgc cgaaggatgt cgctgccgac tgggcaatgg agcgcctgcc ggcccagtat 3540

cagcccgtca tacttgaagc tagacaggct tatcttggac aagaagaaga tcgcttggcc 3600

tcgcgcgcag atcagttgga agaatttgtc cactacgtga aaggcgagat caccaaggta 3660

gtcggcaaat aatgtctaac aattcgttca agccgacgcc gcttcgcggc gcggcttaac 3720

tcaagcgtta gatgcactaa gcacataatt gctcacagcc aaactatcag gtcaagtctg 3780

cttttattat ttttaagcgt gcataataag ccctacacaa attgggagat atatcatgaa 3840

aggctggctt tttcttgtta tcgcaatagt tggcgaagta atcgcaacat ccgcattaaa 3900

atctagcgag ggctttacta agctgatccg gtggatgacc ttt 3943

<210> 57
<211> 10863
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<222> (1)..(10863)
<223> DNA sequence of the plasmid pCP140

<400> 57
tggacataag cctgttcggt tcgtaagctg taatgcaagt agcgtatgcg ctcacgcaac 60

tggtccagaa ccttgaccga acgcagcggt ggtaacggcg cagtggcggt tttcatggct 120

tgttatgact gttttttgg ggtacagtct atgcctcggg catccaagca gcaagcgcgt 180

tacgccgtgg gtcgatgttt gatgttatgg agcagcaacg atgttacgca gcagggcagt 240

cgccctaaaa caaagttaaa catcatgagg gaagcggtga tcgccgaagt atcgactcaa 300

ctatcagagg tagttggcgt catcgagcgc catctcgaac cgacgttgct ggccgtacat 360

ttgtacggct ccgcagtgga tggcggcctg aagccacaca gtgatattga tttgctggtt 420

acggtgaccg taaggcttga tgaaacaacg cggcgagctt tgatcaacga ccttttggaa 480

acttcggctt cccctggaga gagcgagatt ctccgcgctg tagaagtcac cattgttgtg 540

cacgacgaca tcattccgtg gcgttatcca gctaagcgcg aactgcaatt tggagaatgg 600

cagcgcaatg acattcttgc aggtatcttc gagccagcca cgatcgacat tgatctggct 660

atcttgctga caaaagcaag agaacatagc gttgccttgg taggtccagc ggcggaggaa 720

ctctttgatc cggttcctga acaggatcta tttgaggcgc taaatgaaac cttaacgcta 780

tggaactcgc cgcccgactg ggctggcgat gagcgaaatg tagtgcttac gttgtcccgc 840

atttggtaca gcgcagtaac cggcaaaatc gcgccgaagg atgtcgctgc cgactgggca 900

atggagcgcc tgccggccca gtatcagccc gtcatacttg aagctagaca ggcttatctt 960

ggacaagaag aagatcgctt ggcctcgcgc gcagatcagt tggaagaatt tgtccactac 1020

gtgaaaggcg agatcaccaa ggtagtcggc aaataatgtc taacaattcg ttcaagccga 1080

cgccgcttcg cggcgcggct taactcaagc gttagatgca ctaagcacat aattgctcac 1140

agccaaacta tcaggtcaag tctgctttta ttatttttaa gcgtgcataa taagccctac 1200

acaaattggg agatatatca tgaaaggctg gctttttctt gttatcgcaa tagttggcga 1260

agtaatcgca acatccgcat taaaatctag cgagggcttt actaagctga tccggtggat 1320

gacctttga atgaccttta atagattata ttactaatta attggggacc ctagaggtcc 1380

ccttttttat tttaaaaatt ttttcacaaa acggtttaca agcatacgtt ggccgattca 1440

ttaatgcagc tggcacgaca ggtttcccga ctggaaagcg ggcagtgagc gcaacgcaat 1500

taatgtgagt tagctcactc attaggcacc ccaggcttta cactttatgc ttccggctcg 1560

tatgttgtgt ggaattgtga gcggataaca atttcacaca ggaaacagct atgaccatga 1620

ttacgccatc gaccgttaaa tctatcaccg caagggataa atatctaaca ccgtgcgtgt 1680

tgactatttt acctctggcg gtgataatgg ttgcatgtac taatctagat aaggaatata 1740

gccatggaag tgaaaatctt caacacccag gatgttcagg attttctgcg tgttgcaagc 1800

ggtctggaac aagagggtgg taatccgcgt gttaaacaaa ttattcatcg tgttctgagc 1860

gacctgtata aagcaattga agatctgaat atcaccagcg acgaatattg ggcaggcgtt 1920

gcatatctga atcagctggg tgcaaatcaa gaagcaggtc tgctgagtcc gggtctgggt 1980

tttgatcatt atctggatat gcgtatggat gcagaagatg cagcactggg tattgaaaat 2040

gcaacaccgc gtaccattga aggtccgctg tatgttgcgg gtgcaccgga aagcgttggt 2100

tatgcacgca tggatgatgg tagcgatccg aatggtcata ccctgattct gcatggcacc 2160

atttttgatg cagatggtaa accgctgccg aatgcaaaag ttgaaatttg gcatgcaaac 2220

accaaaggct tttatagcca ttttgatccg accggtgaac agcaggcctt taatatgcgt 2280

cgtagcatta ttaccgatga gaatggtcag tatcgtgttc gtaccattct gcctgccggt 2340

tatggttgtc ctccggaagg tccgacccag caactgctga accaactggg tcgtcatggt 2400

aatcgtccgg cacatattca ttattttgtt agcgcagatg gtcaccgtaa actgaccacc 2460

cagattaatg ttgccggtga tccgtatacc tatgatgatt ttgcatatgc cacccgtgaa 2520

ggtctggttg ttgatgcagt tgaacatacc gatccggaag caattaaagc caatgatgtg 2580

gaaggtcctt ttgccgaaat ggtgtttgat ctgaaactga cccgtctggt tgatggtgtt 2640

gataatcagg ttgtggatcg tccgcgtctg gcagtttaat acaccaaaat ggttcaaaat 2700

tatcaggcga gtgatcatga tcactggcct gtttttattt cagggaaggg tggagacaat 2760

tacgtggata atcagatcat ccaagaaacc gtggataaaa ttctgagcgt tctgccgaat 2820

caggcaggtc agctggcacg tctggtgcgt ctgatgcaat ttgcatgcga tccgaccatt 2880

accgttattg gcaaatataa ccatggtaaa agccgtctgc tgaatgaact gattggcacc 2940

gatatcttta gcgttgcaga taaacgtgaa accattcagc tggccgaaca taaacaggat 3000

caggttcgtt ggctggatgc acctggtctg gatgccgatg ttgcagcagt tgatgatcgt 3060

catgcatttg aagcagtttg gacccaggca gatattcgtc tgtttgttca tagcgttcgt 3120

gaaggtgaac tggatgcaac cgaacaccat ctgctgcaac agctgattga agatgccgat 3180

catagccgtc gtcagaccat tctggttctg acccagattg atcagattcc ggatcagacc 3240

atcctgacac agattaaaac cagcattgca cagcaggttc cgaaactgga tatttgggca 3300

gttagcgcaa cccgtcatcg tcagggcatt gaaaacggta aaaccctgct gatcgaaaaa 3360

agcggtattg gtgcactgcg ccataccctg gaacaggcac tggcacaggt gccgagcgca 3420

cgtacctatg aaaaaaatcg tctgctgtca gatctgcacc atcagctgaa acaactgctg 3480

ctggatcaga aacatgttct gcaacaactg caacagacac agcaacagca gctgcatgat 3540

tttgataccg gtctgattaa cattctggac aaaattcgtg ttgatctgga accgattgtg 3600

aatattgatg gtcaggatca agcactgaat ccggatagct ttgcaaccat gtttaaaaac 3660

accgcagcaa aacagcagcg tgccaaagtt cagattgcat atagccgtgc atgcattgaa 3720

atcaacagcc atctgattcg ccatggtgtt gttggtctgc ctgcggaaca gcagaccacc 3780

attaaaagca ttgataccgt gattgttgcc gtgtttggta tcagcgttaa atttcgtgat 3840

cagctgcgtg ccctgtttta taccgatacc gaacgtcagc gtctgcaacg tgaatttcgt 3900

ttctattttg aaaaaagtgc cggtcgcatg attctggcag caaaaattga acagaccatg 3960

cgtcagcagg gctgtattca gaatgccatg atggcactgc aacaaatgga aagcgcagca 4020

taaaaacacg gacgccgcaa acggcgtccg aatttcttgg tcgactctag aggatccccg 4080

ggtaccgagc tcgaattcac tggccgtcgt tttacaacgt cgtgactggg aaaaccctgg 4140

cgttacccaa cttaatcgcc ttgcagcaca tccccctttc gccagctggc gtaatagcga 4200

agaggcccgc accgatcgcc cttcccaaca gttgcgcagc ctgaatggcg aatggcgcct 4260

gatgcggtat tttctcctta cgcatctgtg cggtatttca caccgcatat ggtgcactct 4320

cagtacaatc tgctctgatg ccgcatagtt aagccagccc cgacacccgc caacacccgc 4380

tgacgaattc gttgacagta agacgggtaa gcctgttgat gataccgctg ccttactggg 4440

tgcattagcc agtctgaatg acctgtcacg ggataatccg aagtggtcag actggaaaat 4500

cagagggcag gaactgctga acagcaaaaa gtcagatagc accacatagc agacccgcca 4560

taaaacgccc tgagaagccc gtgacgggct tttcttgtat tatgggtagt ttccttgcat 4620

gaatccataa aaggcgcctg tagtgccatt tacccccatt cactgccaga gccgtgagcg 4680

cagcgaactg aatgtcacga aaaagacagc gactcaggtg cctgatggtc ggagacaaaa 4740

ggaatattca gcgatttgcc cgagcttgcg agggtgctac ttaagccttt agggttttaa 4800

ggtctgtttt gtagaggagc aaacagcgtt tgcgacatcc ttttgtaata ctgcggaact 4860

gactaaagta gtgagttata cacagggctg ggatctattc tttttatctt tttttattct 4920

ttctttattc tataaattat aaccacttga atataaacaa aaaaaacaca caaaggtcta 4980

gcggaattta cagagggtct agcagaattt acaagttttc cagcaaaggt ctagcagaat 5040

ttacagatac ccacaactca aaggaaaagg actagtaatt atcattgact agcccatctc 5100

aattggtata gtgattaaaa tcacctagac caattgagat gtatgtctga attagttgtt 5160

ttcaaagcaa atgaactagc gattagtcgc tatgacttaa cggagcatga aaccaagcta 5220

attttatgct gtgtggcact actcaacccc acgattgaaa accctacaag gaaagaacgg 5280

acggtatcgt tcacttataa ccaatacgct cagatgatga acatcagtag ggaaaatgct 5340

tatggtgtat tagctaaagc aaccagagag ctgatgacga gaactgtgga aatcaggaat 5400

cctttggtta aaggctttga gattttccag tggacaaact atgccaagtt ctcaagcgaa 5460

aaattagaat tagtttttag tgaagagata ttgccttatc ttttccagtt aaaaaaattc 5520

ataaaatata atctggaaca tgttaagtct tttgaaaaca aatactctat gaggatttat 5580

gagtggttat taaaagaact aacacaaaag aaaactcaca aggcaaatat agagattagc 5640

cttgatgaat ttaagttcat gttaatgctt gaaaataact accatgagtt taaaaggctt 5700

aaccaatggg ttttgaaacc aataagtaaa gatttaaaca cttacagcaa tatgaaattg 5760

gtggttgata agcgaggccg cccgactgat acgttgattt tccaagttga actagataga 5820

caaatggatc tcgtaaccga acttgagaac aaccagataa aaatgaatgg tgacaaaata 5880

ccaacaacca ttacatcaga ttcctaccta cgtaacggac taagaaaaac actacacgat 5940

gctttaactg caaaaattca gctcaccagt tttgaggcaa aatttttgag tgacatgcaa 6000

agtaagcatg atctcaatgg ttcgttctca tggctcacgc aaaaacaacg aaccacacta 6060

gagaacatac tggctaaata cggaaggatc tgaggttctt atggcccggc gtagcccaaa 6120

acgcgctgtc gtcaagtcgt taagggcgtg cccttcatca tccgatctgg agtcaaaatg 6180

tcctcacgta aagagcttgc caatgctatt cgtgcgctga gcatggacgc agtacagaaa 6240

gccaaatccg gtcacccggg tgcccctatg ggtatggctg acattgccga agtcctgtgg 6300

cgtgatttcc tgaaacacaa cccgcagaat ccgtcctggg ctgaccgtga ccgcttcgtg 6360

ctgtccaacg gccacggctc catgctgatc tacagcctgc tgcacctcac cggttacgat 6420

ctgccgatgg aagaactgaa aaacttccgt cagctgcact ctaaaactcc gggccacccg 6480

gaagtaggtt ataccgctgg tgtggaaacc accaccggtc cgctgggtca gggtattgcc 6540

aacgcagtcg gtatggcgat tgcagaaaaa acgctggcgg cgcagtttaa ccgtccaggt 6600

cacgacattg tcgaccacta cacctacgcc ttcatgggcg acggctgcat gatggaaggc 6660

atctcccacg aagtttgctc tctggcgggt acgctgaagc tgggtaaact gattgcgttc 6720

tacgatgaca acggtatctc aatcgatggt cacgttgaag gctggttcac tgacgacacc 6780

gcaatgcgtt tcgaagctta cggctggcac gttattcgcg acatcgacgg tcatgacgcg 6840

gcatccatca aacgcgcagt agaagaagcg cgcgcagtga ctgacaaacc gtccctgctg 6900

atgtgcaaaa ccatcatcgg tttcggttcc ccgaacaaag ccggtaccca cgactcccac 6960

ggtgcgccgc tgggcgacgc tgaaattgcc ctgacccgcg aacagctggg ctggaaatac 7020

gcgccgttcg aaatcccgtc tgaaatctat gctcagtggg atgcgaaaga agcaggccag 7080

gcgaaagaat ctgcatggaa tgagaagttt gcggcttacg cgaaagctta tccgcaggaa 7140

gcggctgaat ttacccgccg tatgaaaggc gaaatgccgt ctgacttcga cgccaaagcg 7200

aaagagttta tcgctaaact gcaggctaat ccggcgaaaa tcgccagccg taaagcgtcg 7260

cagaatgcta tcgaagcgtt cggcccgctg ttgcctgaat tcctcggcgg ctctgctgac 7320

ctggcaccgt ctaacctgac cctgtggtct ggttctaaag caatcaacga agatgctgca 7380

ggtaactaca tccactacgg tgttcgcgag ttcggtatga ccgcgattgc taacggtatc 7440

tccctgcacg gtggtttcct gccgtacacc tccaccttcc tgatgttcgt ggaatacgca 7500

cgtaacgccg tacgtatggc tgcgctgatg aaacagcgtc aggtgatggt ttacacccac 7560

gactccatcg gtctgggcga agatggcccg actcaccagc cggttgagca ggtcgcttct 7620

ctgcgcgtga ccccgaacat gtctacatgg cgtccgtgtg accaggttga atccgcggtc 7680

gcgtggaaat acggcgttga gcgtcaggac ggcccgactg cgcttatcct ctcccgtcag 7740

aacctggcgc agcaggaacg aactgaagag caactggcaa acatcgcgcg cggtggttat 7800

gtgctgaaag actgcgccgg tcagccggaa ctgattttca tcgctaccgg ttcagaagtt 7860

gaactggctg ttgctgccta cgaaaaactg actgccgaag gcgtgaaagc gcgcgtggtg 7920

tccatgccgt ctaccgacgc atttgacaag caggatgctg cttaccgtga atccgtactg 7980

ccgaaagcgg ttactgcacg cgttgctgta gaagcgggta ttgctgacta ctggtacaag 8040

tatgttggcc tgaacggtgc tatcgtcggt atgaccacct tcggtgaatc tgctccggca 8100

gagctgctgt ttgaagagtt cggcttcact gttgataacg ttgttgcgaa agcaaaagaa 8160

ctgctgtaat tagcatttcg ggtaaaaagg tcgcttcggc gacctttttt attaccttga 8220

tatgtccgtt tgcggacaag caatagataa agcgtgttgt agatcacaaa tatttatatg 8280

caataaatat caattatgta atatgcatca cgatatgcgt attgacattt gttgttataa 8340

ctataactca atgttatata agaaattaac tcgaggctat tgacgacagc tatggttcac 8400

tgtccaccaa ccaaaactgt gctcagtacc gccaatattt ctcccttgag gggtacaaag 8460

aggtgtccct agaagagatc cacgctgtgt aaaaatttta caaaaaggta ttgactttcc 8520

ctacagggtg tgtaataatt taattacagg cgggggcaac cccgcctgtt ctagaggagg 8580

aggaatcgcc atggagagga ttgtcgttac tctcggggaa cgtagttacc caattaccat 8640

cgcatctggt ttgtttaatg aaccagcttc attcttaccg ctgaaatcgg gcgagcaggt 8700

catgttggtc accaacgaaa ccctggctcc tctgtatctc gataaggtcc gcggcgtact 8760

tgaacaggcg ggtgttaacg tcgatagcgt tatcctccct gacggcgagc agtataaaag 8820

cctggctgta ctcgataccg tctttacggc gttgttacaa aagccgcatg gtcgcgatac 8880

tacgctggtg gcgcttggcg gcggcgtagt gggcgatctg accggcttcg cggcggcgag 8940

ttatcagcgc ggtgttcgtt tcattcaagt cccgacgacg ttactgtcgc aggtcgattc 9000

ctccgttggc ggcaaaactg cggtcaacca tcccctcggt aaaaacatga ttggcgcgtt 9060

ctaccagcct gcttcagtgg tggtggatct cgactgtctg aaaacgcttc ccccgcgtga 9120

gttagcgtcg gggctggcag aagtcatcaa atacggcatt attcttgacg gtgcgttttt 9180

caactggctg gaagagaatc tggatgcgtt gttgcgtctg gacggtccgg caatggcgta 9240

ctgtattcgc cgttgttgtg aactgaaggc agaagttgtc gccgccgacg agcgcgaaac 9300

cgggttacgt gctttactga atctgggaca cacctttggt catgccattg aagctgaaat 9360

ggggtatggc aattggttac atggtgaagc ggtcgctgcg ggtatggtga tggcggcgcg 9420

gacgtcggaa cgtctcgggc agtttagttc tgccgaaacg cagcgtatta taaccctgct 9480

cacgcgggct gggttaccgg tcaatgggcc gcgcgaaatg tccgcgcagg cgtatttacc 9540

gcatatgctg cgtgacaaga aagtccttgc gggagagatg cgcttaattc ttccgttggc 9600

aattggtaag agtgaagttc gcagcggcgt ttcgcacgag cttgttctta acgccattgc 9660

cgattgtcaa tcagcgtaat catcgttcat gcctgatgcc gctatgtagg ccggataagg 9720

cgttcacgcc gcatccggca accgatgcct gatgcgacgc ggtcgcgtct tatcaggcct 9780

acaggtcgat gccgatatgt acatcgtatt cggcaattaa tacatagcac tcgaggccta 9840

cctagcttcc aagaaagata tcctaacagc acaagagcgg aaagatgttt tgttctacat 9900

ccagaacaac ctctgctaaa attcctgaaa aattttgcaa aaagttgttg actttatcta 9960

caaggtgtgg tataataatc ttaacaacag caggacgctc tagaatgaaa accgtaactg 10020

taaaagatct cgtcattggt acgggcgcac ctaaaatcat cgtctcgctg atggcgaaag 10080

atatcgccag cgtgaaatcc gaagctctcg cctatcgtga agcggacttt gatattctgg 10140

aatggcgtgt ggaccactat gccgacctct ccaatgtgga gtctgtcatg gcggcagcaa 10200

aaattctccg tgagaccatg ccagaaaaac cgctgctgtt taccttccgc agtgccaaag 10260

aaggcggcga gcaggcgatt tccaccgagg cttatattgc actcaatcgt gcagccatcg 10320

acagcggcct ggttgatatg atcgatctgg agttatttac cggtgatgat caggttaaag 10380

aaaccgtcgc ctacgcccac gcgcatgatg tgaaagtagt catgtccaac catgacttcc 10440

ataaaacgcc ggaagccgaa gaaatcattg cccgtctgcg caaaatgcaa tccttcgacg 10500

ccgatattcc taagattgcg ctgatgccgc aaagtaccag cgatgtgctg acgttgcttg 10560

ccgcgaccct ggagatgcag gagcagtatg ccgatcgtcc aattatcacg atgtcgatgg 10620

caaaaactgg cgtaatttct cgtctggctg gtgaagtatt tggctcggcg gcaacttttg 10680

gtgcggtaaa aaaagcgtct gcgccagggc aaatctcggt aaatgatttg cgcacggtat 10740

taactatttt acaccaggca taagcaataa tatttcggcg ggaacaccct ccccgccgaa 10800

ctaaaaaata tattcaatcg tatttaataa aaatatttcg tgagtctctg tgcgctaatt 10860

ctc 10863

<210> 58
<211> 5500
<212> DNA
<213> Escherichia coli

<220>
<221> gene
<222> (1)..(5500)
<223> Nucleotide sequence of ppc::PR-pyc

<400> 58
cgaaccgacg tcactacaac cggtacgcgc acataaaggt catatctcta acgccatccg 60

tattcagggc cagtcggggc actccagcga tccagcacgc ggagttaacg ctatcgaact 120

aatgcacgac gccatcgggc atattttgca attgcgcgat aacctgaaag aacgttatca 180

ctacgaagcg tttaccgtgc cataccctac gctcaacctc gggcatattc acggtggcga 240

cgcttctaac cgtatttgcg cttgctgtga gttgcatatg gatattcgtc cgctgcctgg 300

catgacactc aatgaactta atggtttgct caacgatgca ttggctccgg tgagcgaacg 360

ctggccgggt cgtctgacgg tcgacgagct gcatccgccg atccctggct atgaatgccc 420

accgaatcat caactggttg aagtggttga gaaattgctc ggagcaaaaa ccgaagtggt 480

gaactactgt accgaagcgc cgtttattca aacgttatgc ccgacgctgg tgttggggcc 540

tggctcaatt aatcaggctc atcaacctga tgaatatctg gaaacacggt ttatcaagcc 600

cacccgcgaa ctgataaccc aggtaattca ccatttttgc tggcattaaa acgtaggccg 660

gataaggcgc tcgcgccgca tccggcactg ttgccaaact ccagtgccgc aataatgtcg 720

gatgcgatac ttgcgcatct tatccgacct acacctttgg tgttacttgg ggcgatttttt 780

taacatttcc ataagttacg cttatttaaa gcgtcgtgaa tttaatgacg taaattcctg 840

ctatttattc gttcgttaaa tctatcaccg caagggataa atatctaaca ccgtgcgtgt 900

tgactatttt acctctggcg gtgataatgg ttgcatgtac taatctagat aaggaatata 960

gccatgtcgc aaagaaaatt cgccggcttg agagataact tcaatctctt gggtgaaaag 1020

aacaaaatat tggtggctaa tagaggagaa attccaatca gaatttttcg taccgctcat 1080

gaactgtcta tgcagacggt agctatatat tctcatgaag atcgtctttc aacgcacaaa 1140

caaaaggctg acgaagcata cgtcataggt gaagtaggcc aatatacccc cgtcggcgct 1200

tatttggcca ttgacgaaat catttccatt gcccaaaaac accaggtaga tttcatccat 1260

ccaggttatg ggttcttgtc tgaaaattcg gaatttgccg acaaagtagt gaaggccggt 1320

atcacttgga ttggccctcc agctgaagtt attgactccg tgggtgataa ggtctcagct 1380

agaaacctgg cagcaaaagc taatgtgccc accgttcctg gtacaccagg tcctatagaa 1440

actgtagagg aagcacttga cttcgtcaat gaatacggct acccggtgat cattaaggcc 1500

gcctttggtg gtggtggtag aggtatgaga gtcgttagag aaggtgacga cgtggcagat 1560

gcctttcaac gtgctacctc cgaagcccgt actgccttcg gtaatggtac ctgctttgtg 1620

gaaagattct tggacaagcc aaagcatatt gaagttcaat tgttggccga taaccacgga 1680

aacgtggttc atcttttcga aagagactgt tccgtgcaga gaagacacca aaaggttgtc 1740

gaagtggccc cagcaaagac tttaccccgt gaagtccgtg acgccatttt gacagatgca 1800

gttaaattgg ccaaagagtg tggctacaga aatgcgggta ctgctgaatt cttggttgat 1860

aaccaaaata gacactattt cattgaaatt aatccaagaa tccaagtgga acataccatc 1920

acagaagaaa ttaccggtat agatattgtg gcggctcaga tccaaattgc ggcaggtgcc 1980

tctctacccc agctgggcct attccaggac aaaattacga ctcgtggctt tgccattcag 2040

tgccgtatta ccacggaaga ccctgctaag aacttccaac cagataccgg tagaatagaa 2100

gtgtaccgtt ctgcaggtgg taatggtgtt agactggatg gtggtaacgc ctatgcagga 2160

acaataatct cacctcatta cgactcaatg ctggtcaaat gctcatgctc cggttccacc 2220

tacgaaatcg ttcgtagaaa aatgattcgt gcattaatcg agttcagaat tagaggtgtc 2280

aagaccaaca ttcccttcct attgactctt ttgaccaatc cagtatttat tgagggtaca 2340

tactggacga cttttattga cgacacccca caactgttcc aaatggtttc atcacaaaac 2400

agagcccaaa aacttttaca ttacctcgcc gacgtggcag tcaatggttc atctatcaag 2460

ggtcaaattg gcttgccaaa attaaaatca aatccaagtg tcccccattt gcacgatgct 2520

cagggcaatg tcatcaacgt tacaaagtct gcaccaccat ccggatggag gcaagtgcta 2580

ctagaaaagg ggccagctga atttgccaga caagttagac agttcaatgg tactttattg 2640

atggacacca cctggagaga cgctcatcaa tctctacttg caacaagagt cagaacccac 2700

gatttggcta caatcgctcc aacaaccgca catgcccttg caggtcgttt cgccttagaa 2760

tgttggggtg gtgccacatt cgatgttgca atgagatttt tgcatgagga tccatgggaa 2820

cgtttgagaa aattaagatc tctggtgcct aatattccat tccaaatgtt attgcgtggt 2880

gccaatggtg tggcttattc ttcattgcct gacaatgcta ttgaccattt cgtcaagcaa 2940

gccaaggata atggtgttga tatatttaga gtctttgatg ccttaaatga cttggaacaa 3000

ttgaaggtcg gtgtagatgc tgtgaagaag gcaggtggtg ttgtagaagc cactgtttgt 3060

ttctctgggg atatgcttca gccaggcaag aaatacaatt tggattacta cttggaaatt 3120

gctgaaaaaa ttgtccaaat gggcactcat atcctgggta tcaaagatat ggcaggtacc 3180

atgaagccag cagctgccaa actactgatt ggatctttga gggctaagta ccctgatctc 3240

ccaatacatg ttcacactca cgattctgca ggtactgctg ttgcatcaat gactgcgtgt 3300

gctctggcgg gcgccgatgt cgttgatgtt gccatcaact caatgtctgg tttaacttca 3360

caaccatcaa tcaatgctct gttggcttca ttagaaggta atattgacac tggtattaac 3420

gttgagcatg tccgtgaact agatgcatat tgggcagaga tgagattgtt atactcttgt 3480

ttcgaggctg acttgaaggg cccagatcca gaagtttatc aacatgaaat cccaggtggt 3540

caattgacaa acttgttgtt tcaagcccaa caattgggtc ttggagaaca atgggccgaa 3600

acaaaaagag cttacagaga agccaattat ttattgggtg atattgtcaa agttacccca 3660

acttcgaagg tcgttggtga tctggcacaa tttatggtct ccaataaatt aacttccgat 3720

gatgtgagac gcctggctaa ttctttggat ttccctgact ctgttatgga tttcttcgaa 3780

ggcttaatcg gccaaccata tggtgggttc ccagaaccat ttagatcaga cgttttaagg 3840

aacaagagaa gaaagttgac ttgtcgtcca ggcctggaac tagagccatt tgatctcgaa 3900

aaaattagag aagacttgca gaatagattt ggtgatgttg atgagtgcga cgttgcttct 3960

tataacatgt acccaagagt ttatgaagac ttccaaaaga tgagagaaac gtatggtgat 4020

ttatctgtat tgccaacaag aagctttttg tctccactag agactgacga agaaattgaa 4080

gttgtaatcg aacaaggtaa aacgctaatt atcaagctac aggctgtggg tgatttgaac 4140

aaaaagaccg gtgaaagaga agtttacttt gatttgaatg gtgaaatgag aaaaattcgt 4200

gttgctgaca gatcacaaaa agtggaaact gttactaaat ccaaagcaga catgcatgat 4260

ccattacaca ttggtgcacc aatggcaggt gtcattgttg aagttaaagt tcataaagga 4320

tcactaataa agaagggcca acctgtagcc gtattaagcg ccatgaaaat ggaaatgatt 4380

atatcttctc catccgatgg acaagttaaa gaagtgtttg tctctgatgg tgaaaatgtg 4440

gactcttctg atttattagt tctattagaa gaccaagttc ctgttgaaac taaggcatga 4500

tcttcctctt ctgcaaaccc tcgtgctttt gcgcgagggt tttctgaaat acttctgttc 4560

taacaccctc gttttcaata tatttctgtc tgcattttat tcaaattctg aatatacctt 4620

cagatatcct taaggaattg tcgttacatt cggcgatatt ttttcaagac aggttcttac 4680

tatgcattcc acagaagtcc aggctaaacc tctttttagc tggaaagccc tgggttgggc 4740

actgctctac ttttggtttt tctctactct gctacaggcc attatttaca tcagtggtta 4800

tagtggcact aacggcattc gcgactcgct gttattcagt tcgctgtggt tgatcccggt 4860

attcctcttt ccgaagcgga ttaaaattat tgccgcagta atcggcgtgg tgctatgggc 4920

ggcctctctg gcggcgctgt gctactacgt catctacggt caggagttct cgcagagcgt 4980

tctgtttgtg atgttcgaaa ccaacaccaa cgaagccagc gagtatttaa gccagtattt 5040

cagcctgaaa attgtgctta tcgcgctggc ctatacggcg gtggcagttc tgctgtggac 5100

acgcctgcgc ccggtctata ttccaaagcc gtggcgttat gttgtctctt ttgccctgct 5160

ttatggcttg attctgcatc cgatcgccat gaatacgttt atcaaaaaca agccgtttga 5220

gaaaacgttg gataacctgg cctcgcgtat ggagcctgcc gcaccgtggc aattcctgac 5280

cggctattat cagtatcgtc agcaactaaa ctcgctaaca aagttactga atgaaaataa 5340

tgccttgccg ccactggcta atttcaaaga tgaatcgggt aacgaaccgc gcactttagt 5400

gctggtgatt ggcgagtcga cccagcgcgg acgcatgagt ctgtacggtt atccgcgtga 5460

aaccacgccg gagctggatg cgctgcataa aaccgatccg 5500

<210> 59
<211> 200
<212> DNA
<213> Escherichia coli

<220>
<221> promoter

<222> (1)..(200)

<223> Nucleotide sequence of acpP promoter

<400> 59

cacaaaatgc tcatgttgcg cgcagtctgc gtggttatga gtaataatta gtgcaaaatg 60

atttgcgtta ttgggggtga aggcctcaaa ataacgtaaa atcgtggtaa gacctgccgg 120

gatttagttg caaatttttc aacattttat acactacgaa aaccatcgcg aaagcgagtt 180

ttgataggaa atttaagagt 200

<210> 60

<211> 200

<212> DNA

<213> Escherichia coli

<220>

<221> promoter

<222> (1)..(200)

<223> Nuclotide sequence of rplU promoter

<400> 60

ttatggttag gaatataggg tgattgtact gaaaaaatgg cacagataaa cgttaccgta 60

caagttgtgt ttttttttctt cgtgtattga ctgtagcact tgtcaaaggc gtgcgttttg 120

cgtaatattc gcgccctatt gtgaatattt atagcgcact ctgaatcatt gaaaaggtgt 180

gcgcggaagc ggagttttat 200

<210> 61
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>
<221> primer_bind
<222> (1)..(60)
<223> Sequence of DNA primer MS604

<400> 61
aacgccgtat aatgggcgca gattaagagg ctacagtggg cttacatggc gatagctaga 60

<210> 62
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>

<221> primer_bind

<222> (1)..(60)

<223> Sequence of DNA Primer MS605

<400> 62

tgtcggatcg ataaataggg caaaacaaac gcgcatcccg gaaaacgatt ccgaagccca 60

<210> 63

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(60)

<223> Sequence of DNA Primer MS608

<400> 63

aaagtctgcc tgcaagtctg acagggcaac tatttgtggg cttacatggc gatagctaga 60

<210> 64

<211> 60

<212> DNA

<213> Artificial Sequence

<220>
<223> Primer

<220>
<221> primer_bind
<222> (1)..(60)
<223> Sequence of DNA Primer MS609

<400> 64
ttgcaaaatt gccctgaaac agggcaacag cggagtcccg gaaaacgatt ccgaagccca 60

<210> 65
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>
<221> primer_bind
<222> (1)..(25)
<223> Sequence of DNA Primer MS461

<400> 65
ggctatattc cttatctaga ttagt 25

<210> 66

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(25)

<223> Sequence of DNA Primer MS346

<400> 66

gtctgacagg tgccggattt catat 25

<210> 67

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer RP712

<400> 67
tctagataag gaatatagcc atgaccgcac cgattcagga tctgc 45

<210> 68
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>
<221> primer_bind
<222> (1)..(45)
<223> Sequence of DNA Primer RP714

<400> 68
aaatccggca cctgtcagac ttattttgcg ctaccctggt ttttt 45

<210> 69
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>

<221> primer_bind

<222> (1)..(60)

<223> Sequence of DNA Primer RP731

<400> 69

catgtactaa tctagataag gaatatagcc atgaaactga ttattgggat gacgggggcc 60

<210> 70

<211> 60

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(60)

<223> Sequence of DNA Primer RP732

<400> 70

gccggatatg aaatccggca cctgtcagac ttattcgatc tcctgtgcaa attgttctgc 60

<210> 71

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequenc of DNA Primer MS669

<400> 71

tctagataag gaatatagcc atgaaacgac tcattgtagg catca 45

<210> 72

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer MS666

<400> 72

accgaacagg cttatgtcca gatagcaggt atagcggttg aatcg 45

<210> 73

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(24)

<223> Sequence of DNA Primer RP607

<400> 73

tggacataag cctgttcggt tcgt 24

<210> 74

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(25)

<223> Sequence of DNA Primer RP621

<400> 74

ttagatttga ctgaaatcgt acagt 25

<210> 75

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer MS676

<400> 75

tctagataag gaatatagcc atgaaactga tcgtcgggat gacag 45

<210> 76

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>
<221> primer_bind
<222> (1)..(45)
<223> Sequence of DNA Primer MS680

<400> 76
acgatttcag tcaaatctaa ttattcattc tcctgagaaa aattc 45

<210> 77
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>
<221> primer_bind
<222> (1)..(45)
<223> Sequence of DNA Primer MS686

<400> 77
tctagataag gaatatagcc atgacggcac gcatcatcat tggta 45

<210> 78

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer MS684

<400> 78

acgatttcag tcaaatctaa ttaattaaaa cgtagctcgc cttca 45

<210> 79

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer MS692

<400> 79

tctagataag gaatatagcc atgaaacgaa ttgttgtggg aatca 45

<210> 80

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer MS691

<400> 80

acgatttcag tcaaatctaa ttaatccccc tcccaacggc gatca 45

<210> 81

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer RP677

<400> 81

acgatttcag tcaaatctaa ttaatccccc tcccaacggc gatca 45

<210> 82

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(25)

<223> Sequence of DNA Primer RP671

<400> 82

ttaatcgcct tgcagcacat ccccc 25

<210> 83

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(24)

<223> Sequenc of DNA primer RP664

<400> 83

acgaaccgaa caggcttatg tcca 24

<210> 84

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer RP702

<400> 84

gccgtcgttt tacaacgtcg gatccgccta cctagcttcc aagaa 45

<210> 85

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer RP783

<400> 85

cctacaatga gtcgtttcat taggttttcc tcaacccggg agcgt 45

<210> 86

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA primer RP781

<400> 86
cccgggttga ggaaaaccta atgaaacgac tcattgtagg catca 45

<210> 87
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>
<221> primer_bind
<222> (1)..(45)
<223> Sequence of DNA Primer 780

<400> 87
atgtgctgca aggcgattaa gatagcaggt atagcggttg aatcg 45

<210> 88
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>
<221> primer_bind
<222> (1)..(45)
<223> Sequence of DNA Primer RP700

<400> 88
gccgtcgttt tacaacgtcg agcggggcgg ttgtcaacga tgggg 45

<210> 89
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>
<221> misc_feature
<222> (1)..(45)
<223> Sequence of DNA Primer RP784

<400> 89
cctacaatga gtcgtttcat ggctatattc ctcctctgca tgaga 45

<210> 90
<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequenc of DNA Primer RP779

<400> 90

tgcagaggag gaatatagcc atgaaacgac tcattgtagg catca 45

<210> 91

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer MS1383

<400> 91

gatggggtgt ctggggtaat atgtcgcaaa gaaaattcgc cggct 45

<210> 92
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>
<221> primer_bind
<222> (1)..(45)
<223> Sequence of DNA Primer MS1384

<400> 92
gggtttgcag aagaggaaga tcatgcctta gtttcaacag gaact 45

<210> 93
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer MS1429

<400> 93

attcctgcta tttattcgtt cgttaaatct atcaccgcaa gggat 45

<210> 94

<211> 45

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<220>

<221> primer_bind

<222> (1)..(45)

<223> Sequence of DNA Primer MS1430

<400> 94

gcgaattttc tttgcgacat ggctatattc cttatctaga ttagt 45