

SEQUENCE_LISTING_0802US-UTL1_ST25.txt
SEQUENCE LISTING

<110> Sapphire Energy, Inc.
Botsch, Kyle
Szyjka, Shawn
Levine, Wendy
Curran, Amy
O'Neill, Bryan
Mendez, Michael

<120> A SYSTEM FOR TRANSFORMATION OF THE CHLOROPLAST GENOME OF
SCENEDESMUS SP. AND DUNALIELLA SP.

<130> 0802US-UTL1

<150> 61/242735
<151> 2009-09-15

<160> 182

<170> PatentIn version 3.5

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 <223> FLAG epitope tag linked to a MAT epitope tag by a TEV protease site

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 <222> (673)..(759)
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 <223> codon optimized FPP synthase from G. gallus

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 <223> codon optimized fusicoccadiene synthase from P. amygdali

<220>
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 <222> (2158)..(2193)
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2196

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cataatcacc gtcacaaaca caccggt	87

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 <223> modified chloramphenicol acetyl transferase gene from E. coli

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<212> DNA

<213> Artificial Sequence

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<223> modified genomic DNA from *S. dimorphus*

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gtttttaaat	tttaaaaaat	aaatttcttc	tctgctgtgt	ttttcttttt	ttttgaaaaa	2340
acaaagaaaa	aaaatttttt	tgttttcttc	tttgtttttt	tatttctttt	tgttttgttt	2400
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caagcagtaa	aaaataaaaa	ctgtaataaa	aaataaaaca	aaaattttat	ttctttttgt	2520
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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tactcttttc aaatttttat gtttttattt tttttattca taaaaaaaaa caatacataa	2820
aaataaagta tttcggcttc aaaa	2844

<210> 31
 <211> 1284
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> codon optimized cytosine deaminase from E. coli

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ccaataacag aaaattcatt agatgctgaa caaggcttag ttattcctcc tttcgttgag	180
ccacatatac accttgacac aactcaaaca gctggccaac caaattggaa tcaatcaggc	240
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gctcgtgtta cagctagtca tactacagct atgcattctt ataatggagc atacacttct	780
cgtcttttta gattacttaa aatgtcaggt attaacttcg ttgcaaatcc tttagtaaac	840
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gaaatgtag aatctgggtat caatgtatgt tttggtcacg atgatgtatt cgatccatgg	960
tatccattag gcacagctaa tatgttacaa gttttacaca tgggtttaca tgtttgtaa	1020
cttatgggtt acggtcaaat caacgatggc ctttaactta ttacacatca ttctgcacgt	1080
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ccagcagaaa atgggtttga tgctcttcgt cgtcaagtac ctgttcgtta ttctgttcgt	1200
ggcggcaaag ttattgctag tacacaacct gcacaaacaa ctgtatatatt agaacagcca	1260
gaagctattg attacaaacg ttaa	1284

<210> 32
 <211> 1653
 <212> DNA
 <213> Artificial Sequence

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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<220>
<223> codon optimized betaine aldehyde dehydrogenase from S. oleracea

<220>
<221> misc_feature
<222> (1510)..(1650)
<223> tag

<400> 32
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ccagctgcta cagctgaaga cgtagaagta gctgtagtag ctgctcgtaa agctttcaaa      180
cgtaacaaag gtcgtgactg ggctgcttta tggtcacacc gtgctaaata cttacgtgct      240
attgctgcta aaattacaga aaaaaaagac cacttcgtaa aattagaaac attagactca      300
ggtaaaccac gtgacgaagc tgtattagac attgacgacg tagctacatg tttcgaatac      360
ttcgaatact tcgctgggtca agctgaagct ttagacgcta aacaaaaagc tccagtaaca      420
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tcacgtttat tagtacacga atcaattgct gctgaattcg tagaccgtat ggtaaaatgg      960
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acaattatta cagacattac aacatcaatg caaatttgga aagaagaagt attcgggtcca     1200
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ccatgggggtg gtgtaaaacg ttcaggtttc ggtcgtgaat taggtgaatg gggtattgaa     1440
aactacttaa acattaaaca agtaacatca gacatttcag acgaaccatg gggttggtac     1500
aaatcaccaa ccggttacct atacgacgta cctgactatg cttaccctta cgacgtacca     1560
gactatgctt atccatacga cgtaccagac tacgctgaaa acttatactt ccaagggtcac     1620
caccaccacc accatcacca cccaccaggt taa                                     1653

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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<210> 33
 <211> 141
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> 3xHA tag linked to a 6xHIS tag by a TEV protease site

<400> 33
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 tatccatacg acgtaccaga ctacgctgaa aacttatact tccaaggtca ccaccaccac 120
 caccatcacc acccaccagg t 141

<210> 34
 <211> 1647
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> codon optimized betaine aldehyde dehydrogenase from B. vulgaris

<220>
 <221> misc_feature
 <222> (1504)..(1644)
 <223> tag

<400> 34
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 ccagctgggt catcagaaga cattgaagta gctgtagctg ctgctcgtcg tgctttaaaa 180
 cgtaacaaag gtcgtgaatg ggctgctaca tcaggtgctc accgtgctcg ttacttacgt 240
 gctattgctg ctaaagtaac agaacgtaaa gaccattcg taaaattaga aacaattgac 300
 tcaggtaaac cattcgacga agctgtatta gacattgacg acgtagctac atgtttcgaa 360
 tacttcgctg gtcaagctga agctatggac gctaaacaaa aagctccagt aacattacca 420
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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ttaaacatta aacaagtaac atcagacatt tcaaacgaac catgggggttg gtacaaatca	1500
ccaaccggtt acccatacga cgtacctgac tatgcttacc cttacgacgt accagactat	1560
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caccaccatc accaccacc agggttaa	1647

<210> 35
 <211> 2541
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> codon optimized E-alpha-biabolene synthase from A. grandis

<220>
 <221> misc_feature
 <222> (2458)..(2538)
 <223> tag

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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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accggtgaaa acttatactt tcaaggctca ggtggcgggt gaagtgatta caaagatgat	2520
gatgataaag gaaccgggta a	2541

<210> 36

<211> 542

<212> DNA

<213> Artificial Sequence

<220>

<223> modified endogenous promoter from the psbA gene of *S. dimorphus*

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aaatttcaaa aatgtcaatt tttagtctaa aaaatattat tcgatgtttt tttatgacaa	120
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ttttttttaa atttttcaat aaaaacaaaa atatattatt aaagaataca taaaaaaatc	180
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

aaaaattcat aaataaatca ccaaaaaatt tatttttttaa tatttgattt caatattttt	240
atttgaatta aaaatttaaat tattttaaatt ttttatttat atatttgaat ttataacttca	300
gtttttatta aacttaagtt ttcaaatcat aaatttaata gttaatatatt ttttaaactc	360
taaattatta atcttttaaaa tticaaatct ttaacacttg aaattataaa cttcattggt	420
tttgtttgaa ttttttttta agtttgaaaa ctttataaaa ttaaataaac taaatagaat	480
tttgaattgt ataaaaatta aaatgaaaag tttgtgtttt tcagattaaa tgtagcaacc	540
aa	542

<210> 37
 <211> 559
 <212> DNA
 <213> Scenedesmus dimorphus

<400> 37 atttaattctg aaaaacacaa acttttcatt ttaattttta tacaattcaa aattctattt	60
agttttattta attttataaa gttttcaaac ttaaaaaaaaa attcaaaca aaacaatgaa	120
gtttataatt tcaagtgtta aagatttgaa atttttaaga ttaataattt agagttttaa	180
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taaatttttta tttttttat	559

<210> 38
 <211> 716
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> modified endogenous promoter for the psbB gene of S. dimorphus

<400> 38 tttaaattact ttatttatgg aaaaatgtat tttttcgatt tctagagttt ttttacctt	60
tttgaattgt gtgttttttt cttttctaaa agaaaaaaga caattgaaag tcttgtttct	120
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aatataataa taaaatttga aaaaaaagaa aaacaaaaaa taaaagcttt cctctgctta	300
agttgtattt ttttatgttt ttattttttt tgaaagtttt gaaaaaagta caaaaaagtt	360
taaatttttt ttcatTTTTT tcacattttc tttatcatat tatcgtctta agtttttttc	420
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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<210> 39
 <211> 550
 <212> DNA
 <213> Scenedesmus dimorphus

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aacttaagac gataatatga taaagaaaat gtgaaaaaaa tgaaaaaaa tttaaacttt	180
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tatttttaaaa attctagatt tatgataaaa taataaaaaat gaagaaacaa gactttcaat	420
tgtctttttt ctttttagaaa agaaaaaaac acacaattca aaaagtgtaa aaaaactcta	480
gaaatcgaaa aaatacat tttccataaat aaagtaatta agtaaacaaa aattcttttt	540
tcattaattt	550

<210> 40
 <211> 597
 <212> DNA
 <213> Scenedesmus dimorphus

<400> 40	
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tgatgaaaaa tagacatgaa caaaaaat ttt tgaaagtga cttttttaaa aaatttttgg	180
tataatacaa aaaaagaatt tttggaaagg tggcagagt gttgaatgct ctggttttga	240
aaaccagcgt ggcttttacgg tcaccggggg ttcgaatccc tccctttccg ataatatata	300
caaaaat ttt taaagt tttt tgttttatttt gtatagataa aaaatctgca ataaaaat ttt	360
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tttttttatt tttttcataa tttaaaaaat tatgttataa tttaaattac aaataggttt	540
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<210> 41
 <211> 537
 <212> DNA
 <213> Artificial Sequence

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<220>

<223> modified endogenous promoter for the tufA gene of S. dimorphus

<400> 41

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ttgaacttaa aataaaaattt ttaacaaaat ttatttttaa aaaaagaaaa aattttttta	120
ttttggtttt atttatttct ttttttttac aaacaaaaat ttttttaa ac agaataataa	180
aaaaaatttt atttaaagaa tggtttttta atattttgct catgacaaat gattttttac	240
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agcaaacagt taaattgaca ctttttaaaa gtatttatag gcccaaccgg acttgaaccg	360
atgacctatt gcttgaagg caatcactct accaactgag ttatgggcct aaaaaatatt	420
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ctatcttttt tgggtggggg taagtgaaaa aggaaatggg tgctcgcaac gaaaccc	537

<210> 42

<211> 492

<212> DNA

<213> Scenedesmus dimorphus

<400> 42

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taactcagtt ggtagagtga ttgccctaca agcaataggt catcggttca agtccggttg	120
ggcctataaa tactttttaa aagtgtcaat ttaaccgctt gctccataca ctttttataa	180
cttttttgct ttgctgcttt ttttaaaaaa aagcataaaa gtagtaaaaa atcatttgtc	240
atgagcaaaa tatttaaaaa ccattcttta aataaaaattt tttttattat tctgttttaa	300
aaaatttttg ttgttaaaaa aaaagaaata aataaaacca aaataaaaaa attttttctt	360
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tttaattttt gataaaagtaa agttacttgg aaaattgggt tatacagaaa aaattataaa	480
ttattttattc at	492

<210> 43

<211> 557

<212> DNA

<213> Artificial Sequence

<220>

<223> modified endogenous promoter of the rpoA of S. dimorphus

<400> 43

cttggttttt tttctaaatt tacctttaac ttgaaagatc taaaatgaca aaaatttttt	60
ttagagagca agttttactt ttgttgctta aaaaactcaa attacacttt gtcttaagaa	120
ccttttttta ttaaaaaaca aaattttttt attttgtttc tttttattca tttgaaaaaa	180
aagttttcta aacttaactg ataattcaag aaaaaaata tgcctgctac tagattcgaa	240
ctagtgactt tccgcgtatg aaacggatgc tctggccaac tgagctaagc aggcttaata	300
tcatatatta tacaaaaatt ttttcaacaa aaacaagttt ttttttcgaa ttttagaatt	360

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

ttttgattat ttttgtttgt ttgaatattc caaacaaaaa taaagttttt ctcttttttt	420
ttactttttt cctgcttcca aataactaaa aagtttaata gaaaaactct ttttttgaaa	480
gttgtcaaat ttttcctttc aaaaaattat ttttttgttg ggctattttt gaaaataaat	540
gtgagctcgg aaaaaaa	557

<210> 44
 <211> 532
 <212> DNA
 <213> Scenedesmus dimorphus

<400> 44 cgagctcaca tttattttca aaaatagccc aacaaaaaat aattttttga aaggaaaaat	60
ttgacaactt tcaaaaaaag agtttttcta ttaaactttt ttagtatttg gaagcaggaa	120
aaaagtaaaa aaaaagagaa aaactttatt ttgttttgga atattcaaac aaacaaaaat	180
aatcaaaaaa ttctaaaatt cgaaaaaaaa acttgttttt gttgaaaaaa attttgtata	240
atatatgata ttaagcctgc ttagctcagt tggccagagc atccgtttca tacgcggaaa	300
gtcactagtt cgaatctagt agcaggcata tttttttctt gaattatcag ttaagtttag	360
aacaaatgaa taaaaagaaa caaaataaaa aaattttggt ttttaataaa aaaaggttct	420
taagacaaag tgtaatttga gttttttaga caacaaaagt aaaacttggt ctctaaaaaa	480
aatttttgtc atttttagatc tttcaagtta aaggtaaatt tagaaaaaa aa	532

<210> 45
 <211> 483
 <212> DNA
 <213> Scenedesmus dimorphus

<400> 45 aaaagaaatt tttttttatt cttttatttt ttgtatttcc aaaaaatatt ttgtttttct	60
tcaatacagt ttttttgcta ttgctttttc tctttttttt gctttgctgc tttttttttt	120
aagcgtaaaa gtgaaaaaaaa aagtttgtaa aacaaaaaaaa ttgaaaaaaaa aagattgatt	180
ttttatacag taaaaatttt ttgtttttta aatattttatt taaattcaac tcaatttcaa	240
aaaaaaaaatgt ctttgttgaa tgcaaatttt ttgaaacaaa caacaattca aaataaaaca	300
attttttggt taaattcaaa atttttaaat tcatctacag aaaattcttc catgagtatt	360
tttaaaactt taaaggaggt ttgttctgga aaaagaaata tactttgcaa aagtacacct	420
cgtcctatga attctgattt tttaaaaaat aatagttcta ttccttctca aaaacaaaaa	480
gga	483

<210> 46
 <211> 669
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> modified endogenous promoter of the ftsH gene in S. dimorphus

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<400> 46
 agtagaaaaa atgatgtact tgtataaata aaaaataatt atttatacaa aaaatTTTTT 60
 tttatTTTgt ttttactTTT tttcattTTT ttgctTTTgct gttttttatg aatTTTTTtac 120
 tttactgctt tttttcttct ttactTTTtac gctTTTttatc actTTTTttga tttgctgctt 180
 tttttcttct tcattTTTTtg ctttgctgct ttttttcttc ttcattTTTT gctTTtgcaaa 240
 aaatgataaa aagcgtaaaa tgataaaaag cgtaaaatga taaaaagcgt aaaatgataa 300
 aaagcgtaaa agtaaaaaag aaaaaaagca gcaaagtaaa aaagtataa aaagtttaaa 360
 agtgctaaaa agcgtaagta aacaaaaaaa gcaaaagaca aaaaaaagtt ttcaaaaaaa 420
 aatTTTTtatt tttgtTTTTt tataaaaatt ttaacaagtt ttatTTTtcta aataaaaaca 480
 aaaattgtga gttttaaaaa aacgaaaaag ttcaaaaatt tttttttgat ggacaaaaag 540
 aaagaaattt taaatttatt aatTTTTcaa ataactaata aatTTTgttc aacaggagag 600
 aactattgaa aaaaagccta ctatcgaggt tgaaccgata accttcgatt tagctagcaa 660
 ccaacaaac 669

<210> 47
 <211> 557
 <212> DNA
 <213> Scenedesmus dimorphus

<400> 47
 ctgtttcaca acgtttgcat ccaacgcaat cttcagtacg tggtgctgaa gccatttgat 60
 ttgctttaca accattccat ggaaccattt ctaaaacatc taatggacaa gcacgtacac 120
 attgtgtaca accaatacaa gtatcataaa tttttacaat atgtgacatt ttttattttt 180
 aatagaacta ttcaaaaagaa gattgagaat ttcaaaaaag aatTTTTTTta catgaaaaac 240
 gattTTTTtag aaattttact ataaaaaagt aaaaaaaaat attaaatttt gtagtTTTTt 300
 gcaggagcag gatttgaacc tgcgacattg ggattatgag cccacgagc taccagactg 360
 ctctatcctg cgtTTTTTgt tttaaaaagt tttattcgta aaaaaaattt cttttatata 420
 tattacttta ttgatTTTTa tttgtcaaat ttttttttgt ttgaattttt atttcaaatt 480
 ttttaaatat agaaaaaatt tttttttatg ataataaaa actacagttt gaattataaa 540
 taaaaaaaaa aaatgaa 557

<210> 48
 <211> 580
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> modified endogenous promoter of the rbcL gene in S. dimorphus

<400> 48
 tttttttggg gttggttacg gtttttttta cttttgcttt ttttgctttt gttcaaagaa 60
 aaaaaaatac aaaataaaaa aaactaaaat gaaaaaaca agaattctaa aattcataaa 120
 aaaaattaaa acccaatttt ttttttgga acttttccaa ataataaaaa aatcaaaaaa 180

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

aaatttttct agtat	ttttt	tcatattttg aaactttttt tgagtttata aaaaaataga	240
aaaaacaaat agatg	aaaaat	ttagaaaaat tataaaccaa taaaaatgaa gttttgcgta	300
gaaaaaaaaat ttagttt	tact	tgttcccaa gagcaagtgg taactttgaa aaaaatattt	360
aaacttaaaa atttg	ctaaa	gttttgaatt tatgttaaaa ttttaaaaa ataaaaattt	420
ttaaactatt ttttt	tatgtt	aaaaaaatag tttttattat tttctataat atagtttagt	480
tttttatttt tttca	atttc	ttttttttt ttcaaagaaa aaagttttcc acggatagat	540
ttttatagga tcgac	aaaaat	gttctatgaa ctttaaaaaa	580

<210> 49
 <211> 555
 <212> DNA
 <213> Scenedesmus dimorphus

<400> 49		
ggtttttttt actttt	gctt tttttgcttt tgttcaaaga aaaaaaata caaaataaaa	60
aaaactaaaa tgaaaa	aaca aagaattcta aaattcataa aaaaaattaa aaccaattt	120
tttttttgga aacttt	tcca aataataaaa aaatcaaaaa aaaatttttc tagtattttt	180
ttcatatttt gaaact	ttttt ttgagtttat aaaaaaatag aaaaaacaaa tagatgaaaa	240
tttagaaaaa ttataa	acca ataaaaatga agttttgcgt agaaaaaaaa tttagtttac	300
ttgttcccca agagca	agt gtaactttga aaaaaatatt taaacttaaa aatttgctaa	360
agttttgaat ttatgt	ttaaa atttaaaaaa aataaaaaatt tttaaactat ttttttatgt	420
taaaaaaaaa gttttt	tatta ttttctataa tatagtttag tttttatttt ttttcaattt	480
cttttttttt ttcaa	agaaa aaagttttcc acggatagat ttttatagga tcgacaaaat	540
gttctatgaa ctttt		555

<210> 50
 <211> 532
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> modified endogenous promoter for the chlB gene from S. dimorphus

<400> 50		
cccagtcctt agtac	gtggt gctgaagcca tttgatttgc tttacaacca ttccatggaa	60
ccattttctaa aacat	ctaatt ggacaagcac gtacacattg tgtacaacca atacaagtat	120
cataaatttt tacaat	atgt gacatttttt atttttaata gaactattca aaagaagatt	180
gagaattttca aaaa	agaatt tttttttaca tgaaaaacga ttttttagaa attttactat	240
aaaaaagtaa aaaaa	aatat taaattttgt agttttttgc aggagcagga tttgaacctg	300
cgacattggg attat	gagcc ccacgagcta ccagactgct ctatcctgcg ttttttgttt	360
taaaaagttt tattc	gtaaa aaaaatttct tttatatata ttactttatt gatttttatt	420
tgtcaaat	ttt tttttgttt gaatttttat ttcaaat	480
tttttatgat aatata	aaaac tacagtttga attataaata aaaaaaaaa at	532

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<210> 51
 <211> 615
 <212> DNA
 <213> *Scenedesmus dimorphus*

<400> 51
 taaaccgaag gttatcgggt caactccgat agtaggcttt ttttcaatag ttctctcctg 60
 tgaacaaaat ttattagtta ttgacaaaa ttaataaatt taaaattcctt tccttttgtc 120
 catcaaaaaa aaaatttttg aactttttcg tttttttaa actcacaatt ttttgtttta 180
 ttagaaaaata aaacttggtta aaatttttat aaaaaaaca aaataaaaat ttttttttga 240
 aaactttttt ttgtcttttg ctttttttgt ttacttacgc ttttttagcac ttttaaattt 300
 tttatcactt ttttactttg ctgctttttt tcttctttac ttttacgctt tttatcattt 360
 tacgcttttt atcatttttac gctttgcaaa aaatgaagaa gaaaaaaagc agcaaagcaa 420
 aaaatgaaga agaaaaaaag cagcaaatca aaaaagtgat aaaaagcgta aaagtaaaga 480
 agaaaaaaag cagtaaagta aaaaattcat aaaaaacagc aaagcaaaaa aatgaaaaaa 540
 agtaaaaaaca aaataaaaaa aaattttttg tataaataat ttttttttat ttatacaagt 600
 acatcatttt ttcta 615

<210> 52
 <211> 533
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> modified endogenous promoter of the petA gene in *S. dimorphus*

<400> 52
 tgcacaaaag aaatcaaag ttttcaaac gtgcaaacat caaattgcac aaaataattt 60
 ttaaaattca ttttatgaaa gttcgttctt cagttaaaaa aatttgtact aaatgtcgtt 120
 taattcgtcg aaaagggtaca gtaatgggtta tttgtacaaa tcctaaacat aaacaacgtc 180
 aaggataatt ttttttaatg gaagaaatgt tttttacttc ttccattaaa aaagaaaaaa 240
 gaaaagtgc gaactttttt ttgatcaaa aaaaagatac aaaaaatttt tttgttttaa 300
 ttttatgata taattctatt tcagagaaga aaaaaaaatt taaacaaaac aaaaaaatac 360
 agagaagttt aaatttagac ctaaaggtag atttccataa attcattttt ctcatttggt 420
 tttttctttt ttttgcattg cgaaaaaaaa aagaaaaaag caaaaagtca ttttaaagag 480
 araaatggag aaagataaaa gtttttaact ttttttgaac aattccatgg ggg 533

<210> 53
 <211> 521
 <212> DNA
 <213> *Scenedesmus dimorphus*

<400> 53
 acaaaagaaa tcaaatgttt tcaaatcgtg caaacatcaa attgcacaaa ataattttta 60
 aaattcattt tatgaaagtt cgttcttcag ttaaaaaaat ttgtactaaa tgtcgtttta 120

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

ttcgtcgaaa aggtacagta atggttattt gtacaaatcc taaacataaa caacgtcaag	180
gataatTTTT tttaatggaa gaaatgtttt ttactttctt cattaaaaaa gaaaaaagaa	240
aagtgcagaa cttttttttt gatcaaaaaa aagatacaaa aaattttttt gttttaattt	300
tatgatagaa ttctatttca gagaagaaaa aaaaatttaa acaaaacaaa aaaatacaga	360
gaagtttaaa ttttagacct aaggtagatt tccataaatt catTTTTtctc atttgttttt	420
ttctTTTTtt tgcatTgcaa aaaaaaaaaga aaaaagcaaa aagtcatttt aaagagaaaa	480
atggagaaag ataaaagttt ttaacttttt ttgaacaatt c	521

<210> 54
 <211> 503
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> modified endogenous promoter for the petB gene from S. dimorphus

<400> 54	
aagaaagttt aaaaaaattt acataagaag aagatacaaa aacaaattat tttcaatttt	60
tgttttgtaa aaaaaaaatt tcgtttttta gaatttctat gttttttttt attttttggt	120
ttctgaaaaa aaaagttttt tcagaaaaca agaagaaaat taaaggctca caaaataaaa	180
attattttgt tacaacgac caatgtttat tattttttgt ttttttcatt ttctatttct	240
cacttatctt tttaaagtca aaagaaaatt tagaatgaaa gtaaaaaaaaa gaaaaaacia	300
taaaaaacia aaaagcaaaa aaatttcttt gcaatttttg tttaaaaatt tttggtttca	360
attttaaaat ttatgaaaaa tgtacaccat aagtctaaaa ttacaaaaa ttatctaaaa	420
aaacttcttt cttttgtaac aaaaggcaat aagcccataa ttcgagcact ttaattggt	480
tttgtaaaca aaccaaaaaa aaa	503

<210> 55
 <211> 513
 <212> DNA
 <213> Scenedesmus dimorphus

<400> 55	
aaaaacaatt aaaagtgtc gaattatggg cttattgcct tttgttacia aagaaagaag	60
tttttttaga taatttttgt aaattttaga cttatggtgt acatttttca taaattttaa	120
aattgaaacc aaaaattttt aaacaaaaat tgcaaagaat tttttttgct tttttgtttt	180
tttattgttt tttctttttt ttactttcat tctaaatttt cttttgactt taaaaagata	240
agtgagaaat agaaaatgaa aaaaacaaaa aataataaac attggtcggt tgtaacaaaa	300
taatttttat tttgtagacc tttattttt ttcttgtttt ctgaaaaaac tttttttttc	360
agaaaacaaa aaataaaaaa aacatagaa attctaaaaa acaatttttt tttttacaaa	420
acaaaattga aaaaatttgt ttttgaatct tattcctatg aattttttta actttttcgt	480
ttaatggtat tataaaaaat tttctttttc tat	513

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<210> 56
 <211> 537
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> modified endogenous terminator region for the rbcL gene from S. dimorphus

<400> 56
 ttttttaaaat acttcctctt taaaggggaa gtattttttt cttgatttta gaactctaaa 60
 aacacaaaatt gttttttttt gtttttcatt ttcatttatt tattgataaa aacaaaagaa 120
 gcagcaaagc aaaaaaacia aaaaaactaa aaaaatttgt tttgttcatt tcaatagaat 180
 aaaaaaaaaca aaattttttca aaaaaattta taaaattatt gtaagttttc aatacaaaaa 240
 atttttttaa aatattttttt aatatgtttt ttttttaa tgaaaaaaaaa aattcaaaac 300
 aaagaattttt aaaaaaatag aagagttttt aattaaaaaa aattgaaatt tcaaaaattt 360
 tttgttaata taatcttttag tataattcat gcaaaataaa tgacaaatga gtcaaaaaaa 420
 agcatgggcc gatgcccagag tggttaatgg gggcggattg taaatccgct gggtacgcct 480
 acgttggttc gaatccgact cggcccaaaa atacaaaata cattgtttga aagacta 537

<210> 57
 <211> 538
 <212> DNA
 <213> Scenedesmus dimorphus

<400> 57
 ttttttttta aaatacttcc tctttaaagg ggaagtattt ttttcttgat tttagaactc 60
 taaaaacaca aattgtttat ttttgttttt cattttcatt tattttattga taaaaacaaa 120
 agaagcagca aagcaaaaaa acaaaaaaaa ctaaaaaaat ttgttttggt catttcaata 180
 gaataaaaaa aacaaaattt ttcaaaaaaa tttataaaat tattgtaagt tttcaatata 240
 aaaaattttt taaaaatatt ttttaatatg tttttttttt aaattgaaaa aaaaaattca 300
 aaacaaaagaa ttttaaaaaa atagaagagt ttttaattaa aaaaaattga aatttcaaaa 360
 attttttggt aatataatct ttagtataat tcatgcaaaa taaatgatca aatgagtcaa 420
 aaaaaagcat gggccgatgc ccgagtgggt aatgggggcg gattgtaaat ccgctgggta 480
 cgcctacgtt gggtcgaatc cgactcggcc caaaaatata aaatacattg tttgaaag 538

<210> 58
 <211> 669
 <212> DNA
 <213> Scenedesmus dimorphus

<400> 58
 ctagatttta ttttttatga aaaactcagg ctttaatttag gcttgagttt ttcattcttt 60
 ttgaagctct gaaattttta aatttctagt cttctttaat gtttttaaat tttaaaaaat 120
 aaatttcttc tctgctgtgt ttttcttttt ttttgaaaaa acaaagaaaa aaaatttttt 180
 tgttttcttc tttgtttttt tatttctttt tgttttggtt attttttagt ttcagaatct 240

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

ttgattcaaa aaaaaattta gtccgattac tccataggag caagcagtaa aaaataaaaa	300
ctgtaataaa aaataaaaca aaaattttat ttctttttgt tttgcttgaa cttttcaaaa	360
aaaaattgaa aaattcaagc aaaacaaaaa gaaacaaata aaaaatttat gaattttcta	420
ctttttcagg agttgaaatt tctcctttac ttaaaacata ttttgctaaa aaaagcgctt	480
gtgttgcttt ttttgctact ttttgtttcc aagcattttt tcgaatattt ttttttgatt	540
ttgatgtgcg tttttgttaa cctaaaatct tgaaaagatt tactcttttc aaatttttat	600
gtttttattt tttttattca taaaaaaaaa caatacataa aaataaagta tttcggcttc	660
aaaaactag	669

<210> 59
 <211> 597
 <212> DNA
 <213> Scenedesmus dimorphus

<400> 59 aattttccatt tttttcattt ttttttagaa aagttgtatt tttcttgatg aaatgaaaat	60
ttcaaaaaag aaaaaatacaa tttttctcta cttttttttg attctttact tttttttgaa	120
ttttttttgt gcttcgtttt tgaaaaaaac tttttatttg aaaaattttg ttgaattaaa	180
aaaaatcaac tcaatacatt ttttttgaac ttctttttac ttttttgctt tgttgctttt	240
ctttttcattt ttatcatttt ttgcttcgct gctttttatc attttttgct ttgcaaaaaa	300
tgaagaagaa aaaaagcgta aaatgaaaaa gaaaaaaagt ttcaaagaa aaaaagcgaa	360
aaagcaagag aagataaaaa acaagaacaa aaaaattgtt caaaaacaca atagaaaatt	420
cttttaaaaat tttttgattt tttatagaat ttgtgagaaa tagtaaaaaa agtcaaaaaa	480
tcacaacatt ataaatagaa aaaatcttgt ttgttaaaaa ttataattt tttatattat	540
ttcaatttta aataagatct tttggagctg aaaaaatatg agaaatagtt tggacaa	597

<210> 60
 <211> 12
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> nucleic acid linker

<400> 60 gaggcagatc aa	12
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<210> 61
 <211> 12
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> nucleic acid linker

<400> 61 gaggtaatac tt	12
---------------------------	----

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<210> 62
 <211> 514
 <212> DNA
 <213> *Dunaliella tertiolecta*

<400> 62
 gtatacgaag cctttaaggt taaagagata tatgttaaata taaacataaa cgaaaagact 60
 tttaaattttt caaataaaaa aaaagataca gaggggtacta atattttaata ttatgacctt 120
 ctgtatccta tacttaataa gtataaatta taatatagat taataaatct attcaagtta 180
 ataaactgtg tttttatttt atttaaatgat tttctctact aaatattaaa tatgttatta 240
 tttatacata gtgttttttc tttttttttt ttaagcctgt ttaactcaat cggtagagta 300
 ttggttttgt aaaccaaagg ttgcgggttc gattcctgta gcaggctact aattttttta 360
 gatattttat attttaaaaa tatcttttta aaataaaaaa aaaatttttt aaatcgattt 420
 taaaaataaa aaaagctata cttataaatg caataaaggt taaaaaaaaa attaaacgat 480
 atgatgaatt ataaaaatta ttatggagat gcac 514

<210> 63
 <211> 491
 <212> DNA
 <213> *Dunaliella tertiolecta*

<400> 63
 ctctagctag gacatctccc tttcacggag gaaacaggga ttcgaattcc cttgggggta 60
 aaaaaaaaaat agtatatata taggtattta tacatttttc aataaatatt tgattgagag 120
 ttactaaata atctaatttg aattaaaata aattgaatgt ataattctat gtttcgctct 180
 cccacagggt tataataact attattttat ttgaattatt tttttgaagt atatttcctt 240
 atttaaagtg cttagaaata attaattatt aataacatct gttttttttt tacttatttt 300
 tgaaagttca gtttcaatta taaaaatatt atttatataa tattcagaat aaaaattatg 360
 agtctaatta tgaattaata aaaaaaaaaa aaataaattc atcaaaagta tattaaaaaa 420
 taaaaaaggc taaaattaaa tatactcgaa aaattggctt atatataaaa atatattaat 480
 aatgataaac a 491

<210> 64
 <211> 495
 <212> DNA
 <213> *Dunaliella tertiolecta*

<400> 64
 ttttttcttt taggcgggtc cgaagtcctt aggcttattc gaaggaaaaa cgagaaaaat 60
 ttacgtagta aattttcttt gctggccctg ccaaaaacaa caccattaac ctataagtag 120
 taataattct ttagtattac ttttaggtta tttataaatt tgagaagtat agaagaatct 180
 atagattttg cttatgtgtt tatctataga ttcttctata cttctcattt ttaacaaatt 240
 tttattaaga tttttttaaa caaaaaaaaaa gttttcaact tatataatta aacctaaaca 300
 acgttggtata ttttttattt taagtgttgg taaagtatgt ataccagtaa acctttagta 360

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

aattttttta ccgcttaggc taggacctat aaaatttagc gcggcgccct aagagctagg 420
ataaagatcc gttgtctgtc cgctgcgcta aattttcttt agacgaagcg aagcgctcag 480
tctcacgcac ccacc 495

<210> 65
<211> 311
<212> DNA
<213> Dunaliella

<400> 65
ttctaattctc ttaacgagat tagattaatc ccttaatgtc taagggatta atacttatcc 60
catcctgtta aacccaggat gggataaaaa aatttacaag acaaggattt aaaaatgaat 120
aaaaatagat tatatgtatt taaacgtata taataaaatt atgagtaaaa taacagagta 180
aaccaaaaca ataagatttt tttttttttt tttcaattct aaatatcaat atagaaggtt 240
aggaaatttc cccggaaaaa atcctttgga ttttttctta agggcgaaaa aatattctct 300
gaatattttt t 311

<210> 66
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 66
ttggttgggc ggccgccgtt taggtgtaac acaatcttgg 40

<210> 67
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 67
ttggttgggc ggccgctagc cgtggtatct acttcactca 40

<210> 68
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 68
ttggttggct cgaggccctt tcgtcttcaa gaaat 35

<210> 69
<211> 34
<212> DNA
<213> Artificial Sequence

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<220>
 <223> PCR primer

<400> 69
 ttggttggct cgagaagtct tgcgccttaa acca 34

<210> 70
 <211> 77
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 70
 ttggttggct gcagttaatt aaggatccac tagtatttaa attcctgatg cggatatttc 60
 tccttacgca tctgtgc 77

<210> 71
 <211> 116
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 71
 ttggttgggc ggccgctcac agatgagaag atatttgctc gataatcaat actctaggca 60
 tctaactttt cccattgtct taaaccgact taccttagga atcatagttt catgat 116

<210> 72
 <211> 116
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 72
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 tgcgcgttga taccaatcca atggatctac aggagaacg gcctctagcg gttttt 116

<210> 73
 <211> 62
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 73
 ttggttggat ttaaatacta gtggatcctt aattaactgc agggccggcc tctagtttta 60
 tt 62

<210> 74
 <211> 100
 <212> DNA
 <213> Artificial Sequence

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<220>
<223> PCR primer

<400> 74
ttctgcctgt agatccattg gattggtatc aacgcgcagg catagttcga gaaaaattat      60
ccagaggcaa tgacaaccag cacgggctcg agactagtgg                               100

<210> 75
<211> 100
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 75
gaatttttca aaaaattcat actttgtttt tttatttttt ctgagttttt aatcaaaaaa      60
ctttttgtat aaaattcgta agatctccta ggaaaaatgaa                               100

<210> 76
<211> 100
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 76
tttttttgaa aatagttttt ctcaattttt tatttttttt gttttttctc taaaaatcaa      60
aaattcaatt ttgagaaaag ggctcgagac tagtttgtcc                               100

<210> 77
<211> 100
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 77
ggtaagtcgg tttaagacaa tgggaaaagt tagatgccta gagtattgat tatcgagcaa      60
atatcttctc atctgtgact agtgctagct aaagaagttg                               100

<210> 78
<211> 80
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 78
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cacgggctcg agactagtgg                               80

<210> 79
<211> 83
<212> DNA

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<213> Artificial Sequence

<220>

<223> PCR primer

<400> 79

cattaggaat tatctttttc gcaattttct ttagagaacc acctcgtatg gtaaaataac 60

gtaagatctc ctaggaaaat gaa 83

<210> 80

<211> 80

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 80

aaaagttaga tgcctagagt attgattatc gagcaaatac cttctcatct gtgatctcct 60

agtgctagct aaagaagttg 80

<210> 81

<211> 80

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 81

tcaacgccta tggcaactct gtagaatatt catcagcgta acgccttaga atatcatagc 60

ggctcgagac tagtttgtcc 80

<210> 82

<211> 80

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 82

acgctgatga atattctaca gagttgccat aggcgttgaa cgctacacgg acgatacgaa 60

tttttgaatt agataaatga 80

<210> 83

<211> 80

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 83

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ttttgaagcc gaaatacttt 80

<210> 84

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<211> 80
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 84
cattaggaat tatctttttc gcaattttct ttagagaacc acctcgtatg gtaaaataag      60
ggctcgagac tagtttgtcc                                                    80

<210> 85
<211> 80
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 85
cattaccaga gtgctccgca gacgagtatg gcacatggct ccgcgaggct attttctcct      60
agtgctagct aaagaagttg                                                    80

<210> 86
<211> 80
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 86
actctggtaa tgcataatggt ccacaggaca ttcgtcgctt ccgggtatgc gctctatgaa      60
ttcccgtttt aagagcttgg                                                    80

<210> 87
<211> 80
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 87
actgattgac acggttttagc agaacgtttg aggactaggt caaattgagt ggtagttcaa      60
gagaaaaaaaa aagaaaaagc                                                    80

<210> 88
<211> 98
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 88
accactcaat ttgacctagt cctcaaacgt tctgctaaac cgtgtcaatc agtgtctgct      60
tcctgagtga aacccgtaag atctcctagg aaaatgaa                                98

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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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<210> 89
<211> 80
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 89
acgctgatga atattctaca gagttgccat aggcgttgaa cgctacacgg acgatacgaa      60
agcagttgct ttctcctatg                                             80

<210> 90
<211> 80
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 90
tctttggccg ttgtgccggg agcgctcatg tcaatacttt tctcctctag aagttgaaag      60
tacaataaac caagatgaag                                             80

<210> 91
<211> 80
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 91
aaagtattga catgagcgct cccggcacaa cggccaaaga agtctccaat ttcttatttc      60
tttttgaatt agataaatga                                             80

<210> 92
<211> 102
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 92
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caaaaattca attttgagaa aagggttaata actgatataa tt                    102

<210> 93
<211> 102
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 93
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt
 aaaaaacttt ttgtataaaa ttgatcctcg agagatctta tg 102

<210> 94
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 94
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 tttttgaatt agataaatga 80

<210> 95
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 95
 ttggttgac tagtgggtaa taactgatat aatt 34

<210> 96
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 96
 ttggttgac tagtgatcct cgagagatct tatg 34

<210> 97
 <211> 83
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 97
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 gtgggctcga gactagtttg tcc 83

<210> 98
 <211> 83
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 98
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 gtgggctcga gactagtttg tcc 83

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<210> 99
 <211> 43
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR primer

 <400> 99
 ggttggttgc ggccgccggt ccggtagcag ttaataatgt agg 43

 <210> 100
 <211> 59
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR primer

 <400> 100
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 <210> 101
 <211> 57
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR primer

 <400> 101
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 <210> 102
 <211> 44
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR primer

 <400> 102
 ccaaccaagc ggccgcggcg cgcctttatt atgggcgaac gacg 44

 <210> 103
 <211> 1291
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> codon optimized sequence comprising URA3

 <400> 103
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 ttggcgggtg tcggggctgg cttaactatg cggcatcaga gcagattgta ctgagagtgc 180
 accataccac cttttcaatt catcatTTTT tttttattct ttttttgat ttcggtttcc 240
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

acttagattg gtatatatac gcatatgtag tgttgaagaa acatgaaatt gccagatt	360
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tacatataag gaacgtgctg ctactcatcc tagtcctgtt gctgccaagc tatttaatat	480
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actggagtta gttgaagcat taggtcccaa aatttgttta ctaaaaacac atgtggatat	600
cttgactgat ttttccatgg agggcacagt taagccgcta aaggcattat ccgccaagta	660
caatttttta ctcttcgaag acagaaaatt tgctgacatt ggtaatacag tcaaattgca	720
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taaggtagag ggtgaacgtt acagaaaagc aggctgggaa gcatatttga gaagatgcgg	1200
ccagcaaac taaaaaactg tattataagt aaatgcatgt atactaaact cacaaattag	1260
agcttcaatt taattatatc agttattacc c	1291

<210> 104
 <211> 2309
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> codon optimized sequence comprising ADE2

<400> 104	
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attagtgaga agccgagaat tttgtaacac caacataaca ctgacatctt taacaacttt	180
taattatgat acatttctta cgtcatgatt gattattaca gctatgctga caaatgactc	240
ttgttgcatg gctacgaacc gggtaatact aagtgattga ctcttgctga ccttttatta	300
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tgatatcgaa aaactagctg aaaaatgtga tgtgctaacg attgagattg agcatgttga	660
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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tacaacgaaa atggaacagt ttttattaaa gcaagaagaa gaagttcttg tcaaagcaca	2100
aaagttagaa actgtcgggt acgaagctta tctagaaaac aagtaatata taagtttatt	2160
gatatacttg tacagcaaat aattataaaa tgatatacct attttttagg ctttgttatg	2220
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aatttcatac ataagatctc tcgaggatc	2309

<210> 105
 <211> 3688
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> codon optimized sequence comprising URA3-ADE2

<220>
 <221> misc_feature
 <222> (1292)..(1379)
 <223> nucleic acid linker

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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aagttagaaa ctgtcgggtta	cgaagcttat ctagaaaaca agtaatatat aagttttattg	3540
atatacttgt acagcaaata	attataaaat gatataccta ttttttaggc tttgttatga	3600
ttacatcaaa tgtggacttc	atacatagaa atcaacgctt acaggtgtcc ttttttaaga	3660
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<210> 106

<211> 88

<212> DNA

<213> Artificial Sequence

<220>

<223> nucleic acid linker

<400> 106

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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<210> 107
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<212> DNA
<213> Artificial Sequence

<220>
<223> codon optimized comprising TRP1-ARS1-CEN4

<400> 107
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atgtctgtta ttaatttcac aggtagttct ggtccattgg tgaaagtttg cggcttgacag 180
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 <211> 2103
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> codon optimized sequence comprising LEU2

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cccaacaatt acatcaaaat ccacattctc ttcaaaatca attgtcctgt acttccttgt	180
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 <212> DNA
 <213> Artificial Sequence

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<220>

<223> codon optimized sequence comprising CC-93

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<210> 110

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<211> 934
<212> DNA
<213> Artificial Sequence

<220>
<223> codon optimized sequence comprising CC-94

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gcagctggag ctgaaacagc ttcaactgct aaagctattg cagaacaatg tgatgttatt 180
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<210> 111
<211> 8765
<212> DNA
<213> Artificial Sequence

<220>
<223> codon optimized sequence comprising CC93-CC94

<400> 111
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<212> DNA
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<220>
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tggattatca	gcttacagaa
caagaccttt	attagtagtt
	180
ttaccaaaac	aaatggaaca
agttactgct	atattagcag
tatgtcatag	attacgtggt
	240
ccagttgtta	cacgtggtgc
aggtacaggc	ttaagtggcg
gtgcacttcc	tttagaaaaa
	300
ggtgtattat	tagttatggc
acgttttaa	gaaattttag
atattaaccc	agttggtcgt
	360
cgtgcacgtg	ttcaacctgg
tgttcgtaat	ttagcaattt
cacaagcagt	tgctcctcat
	420
aacttatatt	acgctccaga
tcctagtagt	caaattgctt
gttcaattgg	tggtaatgta
	480
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acactgttta	aaatatgggt
taacagtaca	caacttatta
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aaggaatggt	aggtgttaca
	660
acagaagtaa	ctgttaaatt
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ctcgtgtttt	attagcatct
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<220>
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<210> 117
 <211> 1272
 <212> DNA

<213> Artificial Sequence

<220>

<223> codon optimized sequence comprising CC-92

<400> 117

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ggtaatgaag ttacttttaa aactcaagaa cacttagacc gttgtttaac atgccgtaat      240
tgtgaaacta cttgtccaag tggagtacgt tatcataatt tacttgatat aggtcgtgat      300
atcgtagaac aaaaagttaa acgtccttta ccagaacgta ttttacgtga aggacttcgt      360
caagtagttc caagaccagc agttttccgt gctttaactc aagtaggttt agttttacgt      420
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<210> 118

<211> 1179

<212> DNA

<213> Artificial Sequence

<220>

<223> codon optimized sequence comprising HIS3

<400> 118

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ttggcctcct ctagtacact ctatattttt ttatgcctcg gtaatgattt tcattttttt     180
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<211> 4879

<212> DNA

<213> Artificial Sequence

<220>

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<220>
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 <212> DNA
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<211> 5240

<212> DNA

<213> Scenedesmus dimorphus

<400> 125

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 <213> Scenedesmus dimorphus

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<220>
 <223> PCR primer

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<210> 132
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

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<210> 133
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 <212> DNA
 <213> Dunaliella aertiolecta

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 <213> N. abundans

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 <222> (1477)..(1488)
 <223> N is A, C, T or G

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ccgccacaac gattatacaa tggctctccgt atggggaata ttgaaacagt actttctagc	660
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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gacccaaaacc tacgtaaata	gaataaccgg taatacttaa	taataaacac cataaaaaaa	1860
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<210> 136
 <211> 2996
 <212> DNA
 <213> Chlamydomonas vulgaris

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	aatgtggcgt caagggatgt	ttgttcttcc ttttatgaca	cgthtaggca tcactcaatc	180
	ttgggggtggt tggactatca	gtggtgaaac agcatcaaath	ccagggtatth ggagttatga	240
	gggggttgct gctgctcaca	tcattttatc tggattactt	tttgctgctt ctatttgcca	300
	ctgggtttat tgggaccttg	agctthttccg tgaccacgt	acgtcaaath cagcattaga	360

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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cccagggtgga atttcagcac atcacattgc tgcagggtatt ttaggcgtct tagctggttt	600
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cgggtgttgt cgtgcagacg tgcctttccg tcgttctgaa tctaaataca gtattgaaca	1140
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cgaatgggtc taatatttac tgactttgtg agttttaaaa ctcacaaagt tatttaaacg	2280
aattaaaaag ggttaatata tttccttctt atttctattt agtagtttaa tgtaaacag	2340
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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gcttaaaaagc tttttctctt ttttacagaa agtaaaaaaa attcttttat ttcaaaaatt	2940
atggcaactg gaactacatc aaaagtaaaa tcagaagata ctggaattca actcca	2996

<210> 137
 <211> 1982
 <212> DNA
 <213> TetraseImis suecica

<220>
 <221> misc_feature
 <222> (1050)..(1052)
 <223> N is A, C, T or G

<400> 137	
gtcgtttatt gcggtgcatt taatgcacac atcattagtt tctggttggg ctggttcaat	60
ggccttttat gaacttgctg tttttgatcc atcagatcca gttttaaacc caatgtggcg	120
tcaaggtatg tttgttttac ctttcatgac tcgttttaggt atcacccaat cttgggggtgg	180
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caaccagct aagggtgggt ttattccgta ctggggctat gaacagtggc gatggtattg	960
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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ataaactgaa taccctgtaa tactttaaag taaacaccat aagaaaacag taaaaaaaaa	1740
agcaggactt tccataagta aattttttta atcttttaag ttaaattcaa tagcaataac	1800
taacttattg aattttataaa actctattat tgttatatca taagtgaag aacttttgac	1860
tgaaaaattc aagaaagtaa aaaataattc ctacgtttat atattatggc aacaggaaca	1920
tcaaaagcat ctaaaaatac acctgtaaat acagcaatgg cgacacaatt agaacgctat	1980
aa	1982

<210> 138
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 138
 ccacctcgta tggtaaaata attg 24

<210> 139
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 139
 gaaagaatta tggacagtcc tgct 24

<210> 140
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 140

SEQUENCE_LISTING_0802US-UTL1_ST25.txt		
gaaggaggtc caaaactcac a		21
<210> 141		
<211> 20		
<212> DNA		
<213> Artificial Sequence		
<220>		
<223> PCR primer		
<400> 141		
cctggttctt gaagtgcac		20
<210> 142		
<211> 24		
<212> DNA		
<213> Artificial Sequence		
<220>		
<223> PCR primer		
<400> 142		
tgagttggga aacttttagct tctt		24
<210> 143		
<211> 20		
<212> DNA		
<213> Artificial Sequence		
<220>		
<223> PCR primer		
<400> 143		
aaaagattgc caagaccaa		20
<210> 144		
<211> 25		
<212> DNA		
<213> Artificial Sequence		
<220>		
<223> PCR primer		
<400> 144		
aaaaagaatg aaatttttat gttcg		25
<210> 145		
<211> 20		
<212> DNA		
<213> Artificial Sequence		
<220>		
<223> PCR primer		
<400> 145		
atggatgtcg tcctccaaa		20
<210> 146		
<211> 762		
<212> DNA		
<213> Artificial Sequence		

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<220>

<223> codon optimized sequence comprising BD11

<400> 146

atggtaccag tatctttcac aagtctttta gcagcatctc caccttcacg tgcaagttgc	60
cgtccagctg ctgaagtgga atcagttgca gtagaaaaac gtcaaacaat tcaaccaggt	120
acaggttaca ataacggtta cttttattct tactggaatg atggacacgg tgggtgttaca	180
tatactaattg gacctggtgg tcaatttagt gtaaattgga gtaactcagg caattttggt	240
ggaggaaaaag gttggcaacc tgggtacaaag aataaggtaa tcaatttctc tggtagttac	300
aaccctaattg gtaattctta ttttaagtgt tactggtgga gccgtaaccc attaattgaa	360
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gaagttactt cagatggatc agtttatgat atttatcgta ctcaacgcgt aaatcaacca	480
tctataattg gaactgccac tttctacca taactggagt taagacgtaa tcatcgttca	540
agtggttagtg ttaatacagc aaaccacttt aatgcatggg ctcaacaagg tttacatta	600
ggtacaatgg actatcaa atgtagctgtt gaagggtatt tttcatcagg tagtgcttct	660
atcactgtta gcggtaccgg tgattacaaa gatgatgacg ataaaagtgg tgaaaacctt	720
tattttcaag gccataatca ccgtcacaaa cacactggtt aa	762

<210> 147

<211> 1332

<212> DNA

<213> Artificial Sequence

<220>

<223> codon optimized sequence comprising IS99

<400> 147

atgacagtat acacagcttc agtaacagct ccagtaaaca ttgctacatt aaaatactgg	60
ggtaaacgtg acacaaaatt aaacttacca acaaaactcat caatttcagt aacattatca	120
caagacgact tacgtacatt aacatcagct gctacagctc cagaattcga acgtgacaca	180
ttatgggttaa acggtgaacc aactcaatt gacaacgaac gtacacaaaa ctgtttacgt	240
gacttacgtc aattacgtaa agaaatggaa tcaaaaagacg cttcattacc aacattatca	300
caatggaaat tacacattgt atcagaaaaa aacttcccaa cagctgctgg tttagcttca	360
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ttcgggtggtt acgtagcttg ggaaatgggt aaagctgaag acggtcacga ctcaatggct	540
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attgtagaaa aagacttcgc tacattcgtt aaagaaacaa tgatggactc aaactcattc	780
cacgctacat gtttagactc attcccacca attttctaca tgaacgacac atcaaaacgt	840

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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gtaccagact acgctgaaaa cttatacttc caaggtcacc accaccacca ccatcaccac	1320
ccaccagggt aa	1332

<210> 148
 <211> 660
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> codon optimized sequence comprising CAT

<400> 148 atggagaaaa aaatcactgg atataccacc gttgatatat cccaatggca tcgtaaagaa	60
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attacggcct ttttaagac cgtaaagaaa aataagcaca agttttatcc ggcctttatt	180
cacattcttg cccgcctgat gaatgctcat ccggaattcc gtatggcaat gaaagacggt	240
gagctggtga tatgggatag tgttcacctt tgttacaccg ttttccatga gcaaactgaa	300
acgttttcat cgctctggag tgaataccac gacgatttcc ggcagtttct acacatatat	360
tcgcaagatg tggcgtgtta cggtgaaaac ctggcctatt tccctaaagg gtttattgag	420
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<210> 149
 <211> 90
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 149 agtttttctc aattttttat ttttttggtt ttttctctaa aaatcaaaaa ttcaattttg	60
agaaaacgta agatctccta ggaaaatgaa	90

<210> 150
 <211> 90
 <212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 150

tcggttttaag acaatgggaa aagtttagatg cctagagtat tgattatcga gcaaatatct 60

tctcatctgt gacgggctcg agactagtgg 90

<210> 151

<211> 90

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 151

tggattggta tcaacgcgca ggcatagttc gagaaaaatt atccagaggc aatgacaacc 60

agcatctcct agtgctagct aaagaagttg 90

<210> 152

<211> 90

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 152

tcaaaaaatt catactttgt ttttttatTT tttctgagtt tttaatcaaa aaactttttg 60

tataaaattg ggctcgagac tagtttgtcc 90

<210> 153

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 153

tcttactgga atgatggaca cg 22

<210> 154

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 154

gtgtttgtga cggtgattat gg 22

<210> 155

<211> 22

<212> DNA

<213> Artificial Sequence

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<220>
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 tgtggacctg aacctacttg tg 22

<210> 156
 <211> 22
 <212> DNA
 <213> Artificial Sequence

<220>
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 <400> 156
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<210> 157
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<220>
 <223> PCR primer
 <400> 157
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<210> 158
 <211> 20
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<220>
 <223> PCR primer
 <400> 158
 accgtctgga tcaaaagcag 20

<210> 159
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer
 <400> 159
 ttggagtggg tctgttcgtg 20

<210> 160
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer
 <400> 160
 cagcgtaacat acgtcctgga t 21

<210> 161

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<211> 20
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR primer

 <400> 161
 gttgcgctca accaacatta 20

 <210> 162
 <211> 20
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR primer

 <400> 162
 gtgacggtgg ttgtgtcctt 20

 <210> 163
 <211> 20
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR primer

 <400> 163
 cctgcaggtg gttcttcaat 20

 <210> 164
 <211> 20
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR primer

 <400> 164
 atgtcaatag cgccaacaca 20

 <210> 165
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR primer

 <400> 165
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 <210> 166
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 <212> DNA
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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agtattgcag cagtattctg ggcagctttc gttgtagcag gtactatgtg gtacggttca	780
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caacaagaaa ttcaaaaacg tgtacaagct agtttagctg aaggtgcttc attatctgat	900
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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120

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acagtgttaa tgggaatttt tatggcatta tttgccgttt tccttgtaat tatcttagaa      180
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ttacctggat ggggaacaac tgttttaatg ggtgttttca ttgtactttt tgctgtattc      180
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agctaaatct taa	253