

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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caactctaga tcattacact tcttcttagc tgcttgacca gttgtaggta thtggtcac	1980
tgctthaggt atthcaacta tggctthcaa cthtaacggt thcaacttca accaatcagt	2040
gttgattca caaggctcg thttaaacac atgggctgac atcatcaacc gtgctaactt	2100
aggtatggaa gttatgcagc aacgtaacgc tcacaacttc ccattagact tagcatctgt	2160
agaagctcct tctgtaaacg cttagthttt thttthtatga aaactcagg cthaatthtag	2220
gcttgagtht thcattctth thgaagctct gaaatthta aatthctagt cthctthaat	2280
gtthttaaat thtaaaaaat aaatthcttc tctgctgtgt thttctthtt thttgaaaaa	2340
acaaagaaaa aaatthtttt thgtthcttc thtgthtttt thttctthtt thgtthgtth	2400
atthtttagt thcagaatct thgattcaaa aaaaatthta gtccgattac thcataggag	2460
caagcagtaa aaataaaaa ctgtaataaa aaataaaaaca aaatthttat thctthttgt	2520
thtgcttgaa cthttcaaaa aaaaattgaa aaattcaagc aaacaaaaa gaaacaaata	2580
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

ttttgctaaa aaaagcgctt gtgttgcttt ttttgctact ttttgtttcc aagcattttt	2700
tcgaatattt ttttttgatt ttgatgtgcg tttttgtaa cctaaaatct tgaaaagatt	2760
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

<400> 31	
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ccaataacag aaaattcatt agatgctgaa caaggcttag ttattcctcc tttcgttgag	180
ccacatatac accttgacac aactcaaaca gctggtaaac caaattggaa tcaatcaggc	240
acactttttg aaggatttga acgttgggct gagcgtaaag cattattaac acatgacgat	300
gttaaacaac gtgcttggca aacattaaaa tggcaaattg caaatgggtat acaacatggt	360
cgtactcatg ttgacgtttc agacgcaact ttaacagcat taaaagctat gttagaagtt	420
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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 tttgggtcacg atgatgtatt cgatccatgg	960
tatccattag gcacagctaa tatgttacaa gttttacaca tggggtttaca tgtttgtcaa	1020
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ccagcagaaa atggttttga tgctcttcgt cgtcaagtac ctgttcgtta ttctgttcgt	1200
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gaagctattg attacaaacg ttaa	1284

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

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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

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

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<400> 32
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ttattaaaaa accgtattcc aattattaac ccatcaacag aagaaattat tggtagacatt    120
ccagctgcta cagctgaaga cgtagaagta gctgtagtag ctgctcgtaa agctttcaaa    180
cgtaacaaag gtcgtgactg ggctgcttta tggtcacacc gtgctaaata cttacgtgct    240
attgctgcta aaattacaga aaaaaagac cacttcgtaa aattagaaac attagactca    300
ggtaaacacc gtagcgaagc tgtattagac attgacgacg tagctacatg tttcgaatac    360
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gctggttgta caacagtatt aaaaccatca gaattagctt cagtaacatg tttagaattc    600
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aaagcttttag aagtaggtgc tgtatgggta aactgttcac aaccatgttt cgtacacgct   1380
ccatgggggtg gtgtaaaacg ttcaggtttc ggtcgtgaat taggtgaatg ggggtattgaa   1440
aactacttaa acattaaaca agtaacatca gacatttcag acgaaccatg gggttggtac   1500
aatcaccaa ccggttaccc atacgacgta cctgactatg cttaccctta cgacgtacca   1560
gactatgctt atccatacga cgtaccagac tacgctgaaa acttatactt ccaaggtcac   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 tccaagggtca 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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 ccagctgggtt catcagaaga cattgaagta gctgtagctg ctgctcgtcg tgctttaaaa 180
 cgtaacaaag gtcgtgaatg ggctgctaca tcaggtgctc accgtgctcg ttacttacgt 240
 gctattgctg ctaaagtaac agaacgtaaa gaccatttcg taaaattaga aacaattgac 300
 tcaggtaaac cattcgacga agctgtatta gacattgacg acgtagctac atgtttcgaa 360
 tacttcgctg gtcaagctga agctatggac gctaaacaaa aagctccagt aacattacca 420
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 gaattaggtg gtaaatacacc aattattgta ttcgaagacg tagacattga ccaagtagta 840
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 aacattaataa tttcagaccc attcgaagaa ggttgcgtt taggtccagt aatttcaaaa 1020
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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ggtggtatta aacgttcagg tttcggtcgt gaattaggtg aatgggggtat tgaaaactac	1440
ttaaacatta aacaagtaac atcagacatt tcaaacgaac catgggggttg gtacaaatca	1500
ccaaccggtt acccatacga cgtacctgac tatgcttacc cttacgacgt accagactat	1560
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caccaccatc accaccacc aggttaa	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

<400> 35	
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ttagttcatt ctttaaaatc tccatatatt gatagtagct atcgtgaacg tgctgaagtg	180
cttgaagtg aaataaaagc tatgttaa at ccagcaatta ctggagatgg tgaatcaatg	240
attacacctt cagcttatga cactgcttgg gttgcacgtg taccagcaat tgatggtagc	300
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ttagaacgtt tacttatagt agataatata gttcgtcttg gtatttaccg tcacttcgaa	960
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

tggggtcggtt taaatccaat tgctgactta gaaacaactg ctttaggttt tcgtttatta	1080
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aaattcattt gtagcactgg tcagttaaata aaggatgtgg cttcaatggt aaacttatac	1200
cgtgcatcac aatttagcatt cccaggcgaa aacatttttag atgaagctaa atcttttgcc	1260
accaaatact tacgtgaagc ccttgaaaaa tctgaaactt catcagcttg gaacaataaa	1320
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accggtgaaa acttatactt tcaaggctca ggtggcgggtg 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*

<400> 36

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---	----

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

aaaaattcat aaataaatca ccaaaaaatt ttttttttaa tttttgattt caatattttt	240
atgtgaatta aaaatttaatt tttttaaaat ttttttttat atatttgaat ttataacttca	300
gtttttatta aacttaagtt ttcaaatcat aaatttaata gttaatattt ttttaaactc	360
taaattatta atcttttaaaa tttcaaatct ttaacacttg aaattataaa cttcattggt	420
tttggttgaa 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
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gtttataatt tcaagtgtta aagatttgaa attttaaaga ttaataattt agagttaaaa	180
aaaatattaa ctattaaatt tatgatttga aaacttaagt ttaataaaaa ctgaagtata	240
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gaaatcaaatt attaaaaaat aaattttttg gtgattttatt tatgaatttt tgattttttt	360
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taaattttta 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
tcattttttat tattttatca taaatctaga attttttaaaa tattttttat tttttaccgc	180
ggagcggact aaattttttt taaacaatat tttttaattg aaaacatttt ttttcttcaa	240
aatataataa taaaatttga aaaaaaagaa aaacaaaaaa taaaagcttt cctctgctta	300
agttgtattt ttttatgttt ttattttttt tgaaagtttt gaaaaaagta caaaaaagtt	360
taaatttttt ttcatTTTTT tcacattttc tttatcatat tatcgtctta agtttttttc	420
ttttttttca gtttttttta agaaactgaa aaaaaagaga aaaacttaag acaataaaaa	480

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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aattaaaaaa tattgtttta aaaaaaatTT aatcccgcctc cgcggtaaac agtaaa	716

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

<400> 39	
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aacttaagac gataatatga taaagaaaat gtgaaaaaaa tgaaaaaaa tttaaacttt	180
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tgcttttttt ctttttagaaa agaaaaaac acacaattca aaaagtgtaa aaaaactcta	480
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tcattaattt	550

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

<400> 40	
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tgatgaaaaa tagacatgaa caaaaaattt tgaaagttga ctttttttaa aaatttttgg	180
tataatacaa aaaaagaatt tttggaaagg tggcagagtg gttgaatgct ctggttttga	240
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caaaaatttt taaagttttt tgtttttttt gtatagataa aaaatctgca ataaaaattt	360
cgttttttat ttattcaaaa attctgtttt tttgaaaaga aaataaaaaa aatgccaaaa	420
gtgagttttt tattcaaaata ttagaaaaag tttttgaaaa atttaaaaaa atagaaaaaa	480
tttttttatt tttttcataa tttaaaaaat tatgttataa tttaaattac aaataggttt	540
tattaaaaaa tttttacgta cagatgaatt ctataaaatt attttggaga tcaccat	597

<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 aataaaatTTt ttaacaaaat ttatttttaa aaaaagaaaa aattttttta	120
ttttggtttt atttatttct ttttttttac aaacaaaaat ttttttaa ac agaataataa	180
aaaaaatttt atttaaagaa tgggtttttta atattttgct catgacaaat gattttttac	240
tacttttatg ctttttttca aaaaaagcag caaagcaaaa aagttataaa aagtgtatgg	300
agcaaacagt taaattgaca ctttttaaaa gtattttatag gcccaaccgg acttgaaccg	360
atgacctatt gcttgtaagg caatcactct accaactgag ttatgggcct aaaaaatatt	420
atttatattt tataatagaa tataaaatct aacaacttct ttatcctcct cttttctcac	480
ctatcttttt tgggtggggg taagtgaaaa aggaaatggt tgctcgcaac gaaaccc	537

<210> 42

<211> 492

<212> DNA

<213> Scenedesmus dimorphus

<400> 42

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ggcctataaa tactttttaa aagtgtcaat ttaaccgctt gtcctataca ctttttataa	180
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atgagcaaaa tatttaaaaa ccattcttta aataaaatTTt tttttattat tctgttttaa	300
aaaatttttg ttgttaaaaa aaaagaaata aataaaacca aaataaaaaa attttttctt	360
ttttttaaaa taaattttgt taaaaatttt attttaagtt caataaaaagt tttttaattt	420
tttaattttt gataaagtaa 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 tgcttgctac tagattcgaa	240
ctagtgactt tccgcgtatg aaacggatgc tctggccaac tgagctaagc aggcttaata	300
tcatatatta tacaaaattt 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
gttggtcaaat ttttcctttc aaaaaattat ttttttgttg ggctattttt gaaaataaat	540
gtgagctcgg aaaaaa	557

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

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

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

<400> 45 aaaagaaatt tttttttatt cttttatttt tttgtattcc aaaaaatatt ttgtttttct	60
tcaatacagt ttttttgcta ttgctttttc tcactttttt gctttgctgc tttttttttt	120
aagcgtaaaa gtgaaaaaaa aagtttgtaa aacaaaaaaa ttgaaaaaaa aagattgatt	180
ttttatacag taaaaatttt ttgtttttta aatattttatt taaattcaac tcaatttcaa	240
aaaaaaatgt ctttggtgaa tgcaaatttt tttgaacaaa caacaattca aaataaaaca	300
atttttgggt taaattcaaa attttttaaat tcatctacag aaaattcttc catgagtatt	360
tttaaaactt taaagggagt 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
 agtagaaaa atgatgtact tgtataaata aaaaataatt atttatacaa aaaatttttt 60
 tttattttgt ttttactttt tttcattttt ttgctttgct gttttttatg aattttttac 120
 tttactgctt tttttcttct ttactttttac gctttttatc acttttttga tttgctgctt 180
 tttttcttct tcattttttg ctttgctgct tttttcttct ttcatttttt gcttttgcaaa 240
 aaatgataaa aagcgtaaaa tgataaaaag cgtaaaatga taaaaagcgt aaaatgataa 300
 aaagcgtaaa agtaaaaaag aaaaaaagca gcaaagtaaa aaagtataaa aaagttaaaa 360
 agtgctaaaa agcgtaagta aacaaaaaaa gcaaaagaca aaaaaaagtt ttcaaaaaaa 420
 aattttttatt tttgtttttt tataaaaatt ttaacaagtt ttattttcta aataaaacaa 480
 aaaattgtga gtttttaaaa aacgaaaaag ttcaaaaatt tttttttgat ggacaaaaag 540
 aaagaaattt taaattttatt aatttttcaa ataactaata aattttgttc aacaggagag 600
 aactattgaa aaaaagccta ctatcggagt tgaaccgata accttcgatt tagctagcaa 660
 ccaacaaac 669

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

<400> 47
 ctgtttcaca acgtttgcat ccaacgcaat cttcagtacg tgggtgctgaa gccatttgat 60
 ttgctttaca accattccat ggaaccattt ctaaaacatc taatggacaa gcacgtacac 120
 attgtgtaca accaatacaa gtatcataaa tttttacaat atgtgacatt ttttattttt 180
 aatagaacta ttcaaaagaa gattgagaat ttcaaaaag aattttttta catgaaaaac 240
 gatttttttag aaattttact ataaaaaagt aaaaaaaat attaaatttt gtagtttttt 300
 gcaggagcag gatttgaacc tgcgacattg ggattatgag cccacgagc taccagactg 360
 ctctatcctg cgttttttgt tttaaaaagt tttattcgta aaaaaaattt cttttatata 420
 tattacttta ttgattttta tttgtcaaatt tttttttgt ttgaattttt atttcaaatt 480
 ttttaaatat agaaaaaatt tttttttatg ataataataa 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 gaaaaacaa agaattctaa aattcataaa 120
 aaaaattaaa acccaatttt ttttttgga acttttccaa ataataaaaa aatcaaaaaa 180

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

aaatttttct agtatttttt tcatattttg aaactttttt tgagttttata aaaaaataga	240
aaaaacaaat agatgaaaat ttagaaaaat tataaaccaa taaaaatgaa gttttgcgta	300
gaaaaaaaaat ttagttttact tgttcccaa gagcaagtgg taactttgaa aaaaatattt	360
aaacttaaaa atttgctaaa gttttgaatt tatgttaaaa ttttaaaaaa ataaaaattt	420
ttaaactatt tttttatggt aaaaaaatag tttttattat tttctataat atagtttagt	480
tttttatttt tttcaatttc tttttttttt ttcaaagaaa aaagttttcc acggatagat	540
ttttatagga tcgacaaaat gttctatgaa ctttaaaaaa	580

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

<400> 49 ggtttttttt acttttgctt tttttgcttt tgttcaaaga aaaaaaata caaaataaaa	60
aaaactaaaa tgaaaaaaca aagaattcta aaattcataa aaaaaattaa aaccaattt	120
tttttttgga aactttttcca aataataaaa aaatcaaaaa aaaatttttc tagtattttt	180
ttcatatttt gaaacttttt ttgagtttat aaaaaaatag aaaaaacaaa tagatgaaaa	240
tttagaaaaa ttataaacca ataaaaatga agttttgcgt agaaaaaaa tttagtttac	300
ttgttcccca agagcaagt gtaactttga aaaaaatatt taaacttaaa aatttgctaa	360
agttttgaat ttatgttaaa atttaaaaaa aataaaaatt tttaaactat tttttatgt	420
taaaaaaata gtttttatta ttttctataa tatagtttag tttttatttt ttttcaattt	480
cttttttttt ttcaaagaaa 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 cccagtcttc agtacgtggt gctgaagcca ttgattttgc ttacaacca ttccatggaa	60
ccattttctaa aacatctaata ggacaagcac gtacacattg tgtacaacca atacaagtat	120
cataaatttt tacaatatgt gacatttttt atttttaata gaactattca aaagaagatt	180
gagaatttca aaaaagaatt tttttttaca tgaaaaacga ttttttagaa attttactat	240
aaaaaagtaa aaaaaaatat taaattttgt agttttttgc aggagcagga tttgaacctg	300
cgacattggg attatgagcc ccacgagcta ccagactgct ctatcctgcg ttttttgttt	360
taaaaagttt tattcgtaaa aaaaatttct tttatatata ttactttatt gatattttatt	420
tgtcaaattt ttttttgttt gaatttttat ttcaaatttt ttaaatatag agaaaatttt	480
tttttatgat aatataaac tacagtttga attataaata aaaaaaaaaa 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 taaaattctt tccttttgtc 120
 catcaaaaaa aaaatttttg aactttttcg tttttttaa actcacaatt ttttgtttta 180
 ttagaaaata aaacttggtta aaatttttat aaaaaacaa aaataaaaaat ttttttttga 240
 aaactttttt ttgtcttttg ctttttttgt ttacttacgc ttttttagcac ttttaaattt 300
 tttatcactt ttttactttg ctgctttttt tcttctttac ttttacgctt tttatcattt 360
 tacgcttttt atcattttac gctttgcaaa aatgaagaa gaaaaaaagc agcaaaagcaa 420
 aaaatgaaga agaaaaaaag cagcaaatca aaaaagtgat aaaaagcgta aaagtaaaga 480
 agaaaaaaag cagtaaagta aaaaattcat aaaaaacagc aaagcaaaaa aatgaaaaaa 540
 agtaaaaaca aaataaaaaa aaattttttg tataaataat ttttttttat ttataacaagt 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
 tgacaaaaag aaatcaaag ttttcaaac gtgcaaacat caaattgcac aaaataattt 60
 ttaaaattca ttttatgaaa gttcgttctt cagttaaaaa aatttgtact aaatgtcgtt 120
 taattcgtcg aaaaggtaca gtaatgggtta tttgtacaaa tcctaaacat aaacaacgtc 180
 aaggataatt ttttttaatg gaagaaatgt tttttacttc ttccattaaa aaagaaaaaa 240
 gaaaagtgc gaactttttt tttgatcaaa aaaaagatac aaaaaatttt tttgttttaa 300
 ttttatgata taattctatt tcagagaaga aaaaaaatt taaacaaaac aaaaaaatac 360
 agagaagttt aaatttagac cttaaaggtag atttccataa attcattttt ctcatgtgtt 420
 tttttctttt ttttgattg cgaaaaaaa 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 tatgaaagt cgttcttcag ttaaaaaaat ttgtactaaa tgtcgtttta 120

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

ttcgtcgaaa aggtacagta atggttattt gtacaaatcc taaacataaa caacgtcaag	180
gataatTTTT tttaatggaa gaaatgtttt ttactttctc cattaaaaaa gaaaaaagaa	240
aagtgcagaa cttttttttt gatcaaaaaa aagatacaaa aaatTTTTTT gttttaattt	300
tatgatagaa ttctatttca gagaagaaaa aaaaatttaa acaaaacaaa aaaatacaga	360
gaagtttaaa ttttagaccta aaggtagatt tccataaatt cttttttctc atttgTTTT	420
ttcttttttt tgcattgcaa aaaaaaaga 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 aaaaaaattt 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 aaaattcttt gcaatttttg tttaaaaatt tttggtttca	360
attttaaaat ttatgaaaaa tgtacacat aagtctaaaa tttaaaaaa ttatctaaaa	420
aaacttcttt cttttgtaac aaaaggcaat aagcccataa ttcgagcact ttttaattgtt	480
tttgtaaaca aaccaaaaaa aaa	503

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

<400> 55	
aaaaacaatt aaaagtgtc gaattatggg cttattgcct tttgttaca aagaaagaag	60
tttttttaga taatttttgt aaattttaga cttatggtgt acatttttca taaattttta	120
aattgaaacc aaaaattttt aaacaaaaat tgcaaagaat ttttttgct tttttgtttt	180
tttattgttt ttctttttt ttactttcat tctaaatttt cttttgactt taaaaagata	240
agtgagaaat agaaaatgaa aaaaacaaaa aataataaac attggtcgtt tgtaacaaaa	300
taatttttat ttgtagacc tttattttt ttcttgtttt ctgaaaaaac tttttttttc	360
agaaaacaaa aaataaaaaa aaacatagaa attctaaaaa acaaattttt 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
tttttaaaat acttcctctt taaaggggaa gtattttttt cttgatttta gaactctaaa 60
aacacaaatt gtttattttt gtttttcatt ttcatttatt tattgataaa aacaaaagaa 120
gcagcaaagc aaaaaaacia aaaaaactaa aaaaatttgt tttgttcatt tcaatagaat 180
aaaaaaaaa aaatttttca aaaaaattta taaaattatt gtaagttttc aatacaaaaa 240
attttttaaa aatatttttt aatatgtttt ttttttaaat tgaaaaaaaa aattcaaaac 300
aaagaatttt aaaaaaatag aagagttttt aattaaaaaa aattgaaatt tcaaaaattt 360
tttgtaata taatctttag tataattcat gcaaaataaa tgacaaatga gtcaaaaaaa 420
agcatgggcc gatgccgag tgggttaatgg gggcggattg taaatccgct ggttacgcct 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 tatttattga taaaaacaaa 120
agaagcagca aagcaaaaaa acaaaaaaaa ctaaaaaaat ttgttttggt catttcaata 180
gaataaaaaa acaaaaattt ttcaaaaaaa tttataaaat tattgtaagt tttcaatata 240
aaaaattttt taaaaatatt ttttaatatg tttttttttt aaattgaaaa aaaaaattca 300
aaacaaagaa ttttaaaaaa atagaagagt ttttaattaa aaaaaattga aatttcaaaa 360
attttttggt aatataatct ttagtataat tcatgcaaaa taaatgatca aatgagtcaa 420
aaaaaagcat gggccgatgc ccgagtgggt aatgggggag gattgtaaat ccgctgggta 480
cgcttacgtt gggtcgaatc cgactcggcc caaaaatata aaatacattg tttgaaag 538

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

<400> 58
ctagatttta ttttttatga aaaactcagg cttaatttag 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 ttgcttgaa cttttcaaaa	360
aaaaattgaa aaattcaagc aaaacaaaaa gaaacaaata aaaaatttat gaattttcta	420
ctttttcagg agttgaaatt tctcctttac ttaaacata ttttgctaaa aaaagcgctt	480
gtgttgcttt ttttgctact ttttgtttcc aagcattttt tcgaatattt ttttttgatt	540
ttgatgtgcg tttttgtaa 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 aaaaatacaa tttttctcta cttttttttg attctttact tttttttgaa	120
ttttttttgt gcttcgtttt tgaaaaaac tttttatttg aaaaattttg ttgaattaaa	180
aaaaatcaac tcaatacatt ttttttgaac ttctttttac ttttttgctt tgttgctttt	240
cttttcattt ttatcatttt ttgcttcgct gctttttatc attttttgct ttgcaaaaaa	300
tgaagaagaa aaaaagcgta aaatgaaaaa gaaaaaaagt ttcaaagaaa aaaaagcgaa	360
aaagcaagag aagataaaaa acaagaacaa aaaaattggt caaaaacaca atagaaaatt	420
ctttaaaaat tttttgattt tttatagaat ttgtgagaaa tagtaaaaaa agtcaaaaaa	480
tcacaacatt ataaatagaa aaaatcttgt tttgtaaaaa tttataattt tttatattat	540
ttcaatttta aataagatct tttggagctg aaaaaaatatg 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
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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

<400> 62
 gtatacgaaa cctttaaggt taaagagata tatgttaaata taaacataaa cgaaaagact 60
 ttaaattttt caaataaaaa aaaagataca gagggactata atatttaata ttatgacctt 120
 ctgtatccta tacttaataa gtataaatta taatatagat taataaatct attcaagtta 180
 ataaactgtg tttttatttt atttaatgat 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 caataaagggt taaaaaaaaa attaaacgat 480
 atgatgaatt ataaaaatta ttatggagat gcac 514

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

<400> 63
 ctctagctag gacatctccc tttcacggag gaaacagggga 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 aaataaatc atcaaaaagta 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 tttttttaa caaaaaaaaa gttttcaact tatataatta aacctaaaca 300
 acgttgtata ttttttattt taagtttttg taaagtatgt ataccagtaa acctttagta 360

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

aatTTTTTTTta cCGcttaggc taggacctat aaaatTTtagc gcggcgccct aagagctagg	420
ataaagatcc gttgtctgtc cgctgcgcta aatTTTcttt agacgaagcg aagcgtcgag	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
aaccaaaca ataagatttt tttttttttt tttcaattct aaatatcaat atagaagggt	240
aggaaatttc cccggaaaaa atcctttgga ttttttccta 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 cgtggtattt acttcactca	40

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

<220>
 <223> PCR primer

<400> 68	
ttggttggtt 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
 ttggttggt cgagaagtct tgcgccttaa acca 34

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

<220>
 <223> PCR primer

<400> 70
 ttggttggt gcagttaatt aaggatccac tagtatttaa attcctgatg cggatattttc 60
 tccttacgca tctgtgc 77

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

<220>
 <223> PCR primer

<400> 71
 ttggttggtg gcgcgctcac 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
 ttggttggtg gcgcgctgct ggttgctcatt gcctctggat aatttttctc gaactatgcc 60
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<210> 73
 <211> 62
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 73
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 tt 62

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

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<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

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ctttttgtat aaaattcgta agatctccta ggaaaatgaa 100

<210> 76

<211> 100

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 76

tttttttgaa aatagttttt ctcaattttt tttttttttt gttttttctc taaaaatcaa 60

aaattcaatt ttgagaaaag ggctcgagac tagtttgtcc 100

<210> 77

<211> 100

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 77

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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

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 79

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gtaagatctc ctaggaaaat gaa 83

<210> 80

<211> 80

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 80

aaaagttaga tgcctagagt attgattatc gagcaaatat 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 atatcatacg 60

ggctcgagac tagtttgccc 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

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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

<220>
<223> PCR primer

<400> 84
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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 tgcatatggt 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
gagaaaaaaa aagaaaaagc                                                    80

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

<220>
<223> PCR primer

<400> 88
accactcaat ttgacctagt cctcaaacgt tctgctaaac cgtgtcaatc agtgtctgct      60
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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
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agcagttgct ttctcctatg                                             80

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

<220>
<223> PCR primer

<400> 90
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tacaataaac caagatgaag                                             80

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

<220>
<223> PCR primer

<400> 91
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<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 102

aaaaaacttt ttgtataaaa ttgatcctcg agagatctta tg

<210> 94
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 <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
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<210> 96
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 96
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<210> 97
 <211> 83
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 97
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<210> 98
 <211> 83
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<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
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 <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
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 <210> 103
 <211> 1291
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> codon optimized sequence comprising URA3

 <400> 103
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 ttggcggtg tcggggctgg cttaactatg cggcacaga gcagattgta ctgagagtgc 180
 accataccac cttttcaatt catcattttt tttttattct tttttttgat ttcggtttcc 240
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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tacatataag gaacgtgctg ctactcatcc tagtcctgtt gctgccaagc tatttaatat	480
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caatttttta ctcttcgaag acagaaaatt tgctgacatt ggtaatacag tcaaattgca	720
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taaggtagag ggtgaacgtt acagaaaagc aggtgggaa gcatatttga gaagatgcgg	1200
ccagcaaac taaaaactg tattataagt aaatgcatgt atactaaact cacaaattag	1260
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<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
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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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aaagttagaa actgtcgggt acgaagctta tctagaaaac aagtaatata taagtttatt	2160
gatatacttg tacagcaaat aattataaaa tgatatacct attttttagg ctttgttatg	2220
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<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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<210> 106
 <211> 88
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> nucleic acid linker

<400> 106

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 ttacgctagg gataacaggg taatatag 88

<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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<211> 2103

<212> DNA

<213> Artificial Sequence

<220>

<223> codon optimized sequence comprising LEU2

<400> 108

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<210> 109
 <211> 1833
 <212> DNA
 <213> Artificial Sequence

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<220>

<223> codon optimized sequence comprising CC-93

<400> 109

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gatttacctt tcgatgttca agtagctgaa attgaattcg atccagacat gtatgaacct    540
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<210> 110

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

<211> 934
<212> DNA
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<220>
<223> codon optimized sequence comprising CC-94

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<210> 111
<211> 8765
<212> DNA
<213> Artificial Sequence

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<223> codon optimized sequence comprising CC93-CC94

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gacttttttt actatttctc acaaattcta taaaaaatca aaaaattttt aaagaatttt 180
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<210> 115
 <211> 1553
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> codon optimized sequence comprising CC-90

<400> 115	
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attattccat acgaatgtga tggattatca gcttacagaa caagaccttt attagtagtt	180
ttaccaaaaac aaatggaaca agttactgct atattagcag tatgtcatag attacgtggt	240
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aacgaacctg gtgagtttgc tcgtgctgaa gaacttggtg gaaaaatctt agagttatgt	1260
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atgtgtgctc aattcaatag tgatgaaatt actacatttc acgctgtaaa agctgctttt	1380
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tttggtgcta tgcattgtaca tcacggccat ttaccttttc cagagcttga acgttttgat	1500
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<210> 116
 <211> 1102
 <212> DNA
 <213> Artificial sequence

<220>
 <223> codon optimized sequence comprising CC-91

<400> 116	
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acaggccaaa ctttagacgt tcgttgatcat cgtggtattg taaattatga tccaactgag	180
cttgtaatta ctgcacgtgt tggtagacct ttagtaacaa ttgaagctgc tttagaaagt	240
gctgggtcaaa tgttaccatg tgaaccacct cattacgggtg aagaagctac ttgggggtggt	300
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cgtaatgctg gcggtcacgc aactcgtttc tcagcagggtg atggtggttt cgacacctta	960
tctgctccat tattccgtta tcatcaacaa cttaaacac aattagatcc ttgtggtggt	1020
tttaatccag gacgtatgta cgctgagtta gattataaag atgatgatga taaaggacac	1080
aaccaccgtc acaaacatta gt	1102

<210> 117
 <211> 1272
 <212> DNA

<213> Artificial Sequence

<220>

<223> codon optimized sequence comprising CC-92

<400> 117

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cttggatgatg aattagatgg accaagaggt cgtattttatt taataaaaca agtattagaa      180
ggtaatgaag ttacttttaa aactcaagaa cacttagacc gttgtttaac atgccgtaat      240
tgtgaaacta cttgtccaag tggagtagct tatcataatt tacttgatat aggtcgtgat      300
atcgtagaac aaaaagttaa acgtccttta ccagaacgta ttttacgtga aggacttcgt      360
caagtagttc caagaccagc agttttccgt gctttaactc aagtaggttt agttttacgt      420
ccatttttac ctgaacaagt acgtgctaaa ttacctgcag aaactgttaa agcaaaacca      480
cgtcctcctt tacgtcataa acgtcgtggt ttaatgttag aagggtgcgc tcaaccaaca      540
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gaaaaagttc ttttaagatt aggttttact ttaacagatg ttcctgattc acacttatgt     1020
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aacaaaatga atgcacttga aagtggaaaa ccagaaatga ttgttacagc taatattggc     1140
tgccaaactc acttagcttc tgctggctcg acaagtgttc gtcattggat tgaaattgta     1200
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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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<210> 119
 <211> 4879
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> codon optimized sequence comprising LYS2

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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> codon optimized sequence comprising IS57

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<220>
 <223> codon optimized sequence comprising IS116

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 <213> Artificial Sequence

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 <223> codon optimized sequence comprising IS62

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 <212> DNA
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<210> 125
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 <212> DNA
 <213> Scenedesmus dimorphus

<400> 125

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 <213> Scenedesmus dimorphus
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<213> Artificial Sequence

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<223> codon optimized sequence comprising rb1L-CAT-psbE

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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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 <212> DNA
 <213> Dunaliella aertiolecta

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 <212> DNA
 <213> Dunaliella

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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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 <212> DNA
 <213> Chlamydomonas vulgaris

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	gggggttgct gctgctcaca	tcattttatc tggattactt	tttgctgctt ctatttgga	300
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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

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

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

<400> 137	
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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tgaaaaattc aagaaagtaa aaaataattc ctacgtttat atattatggc aacaggaaca	1920
tcaaagcat ctaaaaatac acctgtaaat acagcaatgg cgacacaatt agaacgctat	1980
aa	1982

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

<220>
 <223> PCR primer

<400> 138
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<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

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gaaggagggtc caaaactcac a		21
<210> 141		
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<213> Artificial Sequence		
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<223> PCR primer		
<400> 144		
aaaaagaatg aaatttttat gttcg		25
<210> 145		
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<213> Artificial Sequence		
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<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

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cgtccagctg ctgaagtgga atcagttgca gtagaaaaac gtcaaacaat tcaaccaggt	120
acaggttaca ataacggtta cttttattct tactggaatg atggacacgg tgggtgttaca	180
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agtggtagtg ttaatacagc aaaccacttt aatgcatggg ctcaacaagg tttaacatta	600
ggtacaatgg actatcaaat tgtagctggt gaagggtatt ttcatcagg tagtgcttct	660
atcactgtta gcggtaccgg tgattacaaa gatgatgacg ataaaagtgg tgaaaacctt	720
tattttcaag gccataatca ccgtcacaaa cacactgggt aa	762

<210> 147

<211> 1332

<212> DNA

<213> Artificial Sequence

<220>

<223> codon optimized sequence comprising IS99

<400> 147

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caagacgact tacgtacatt aacatcagct gctacagctc cagaattcga acgtgacaca	180
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attgtagaaa aagacttcgc tacattcgct aaagaaacaa tgatggactc aaactcattc	780
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SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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ccaccagggt aa	1332

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

<220>
 <223> codon optimized sequence comprising CAT

<400> 148	
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cacattcttg cccgcctgat gaatgctcat ccggaattcc gtatggcaat gaaagacggt	240
gagctggtga tatgggatag tgttcaccct tgttacaccg ttttccatga gcaaactgaa	300
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<210> 149
 <211> 90
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 149	
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<210> 150
 <211> 90
 <212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 150

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tctcatctgt gacgggctcg agactagtgg 90

<210> 151

<211> 90

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR primer

<400> 151

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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

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 <210> 161

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 161
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<210> 162
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<220>
<223> PCR primer

<400> 162
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<210> 163
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ctccattatg aa

12

<210> 173

<211> 1527

<212> DNA

<213> Chlamydomonas reinhardtii

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gaaatttcag tttttgatcc atctgaccca gtattaaacc caatgtggcg tcaaggatg	180
ttcgttctac ctttcatgac acgtttaggt atcacacaat cttgggggtg ttggactatt	240
agcggtgaaa cagctacaaa cccagggtatc tggagttatg aagggtgtgc agcagctcac	300
attattcttt cagggtgcgtt attcttagct tcagtatggc actggacata ctgggattta	360
gaacttttcc gtgaccacg tacaggtaaa acagctttag acttacaaa aatttttggt	420
attcacttat tcttatctgg tttactatgt tttggtttcg gtgcattcca cgtaactggt	480
gtttttggtc ctggtatttg ggtttcagac ccttacgggt taacaggtag gggtcaacca	540
gtagctcctt cttgggggtg tgatgggttt gaccataca acccagggtg tattgcttca	600
caccacatcg cagctgggtt tttagggtgt ttagcagggt tattccactt atgtgtacgt	660
ccttctattc gtttatactt cggtttatca atgggtagta ttgaaactgt attatcaagc	720
agtattgcag cagtattctg ggcagctttc gttgtagcag gtactatgtg gtacggttca	780
gcagctactc caattgaatt atttgggtcca actcggtacc agtgggacca aggtttcttc	840
caacaagaaa ttcaaaaacg tgtacaagct agtttagctg aagggtgctt attatctgat	900
gcatggtcac gtattccaga aaaattagct ttctatgatt acattggtaa taaccagct	960
aaagggtggtt tattccgtac tgggtgctatg aacagtgggt atggtatcgc ttagggttg	1020
ttaggtcacg catcattcaa agatcaagaa ggtcgcgaat tattcggtcg tcgtatgcca	1080
acattctttg aaacattccc agttctttta ttagataaag atggtattgt tcgtgctgac	1140
gttcctttcc gtaaagctga atctaaatat agtattgaac aagtaggtgt atctgttaca	1200
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gctcgtaaag ctcaattagg tgaaatTTTT gaatttgacc gttcaacttt acaatctgat	1320
gggtttttcc gtagtagccc acgtgggttg tttacttttg gtcacgtatg ttttgcatta	1380
ttattcttct ttggtcacat ttggcacggt gctcgtaga tcttccgtga cgtatttgct	1440
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<211> 1527

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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<400> 174

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gaacttgcag tttttgatcc ttctgatcca gttttaaacc caatgtggcg tcaaggatatg	180
tttgttctgc cttttatgac acgtttagggt atcacccaat cttgggggtgg ttggactatt	240
agtggtgaaa ctgctgcaa tcctgggtgtt tggagctatg aagggtgtagc agcagcccac	300
attgttttat cagggtttact ttttgctgca tcgatttggc attgggttta ttgggatctt	360
gaacttttcc gtgatcctcg aacttcaaac ccagcttttag atcttccgaa aatttttgggt	420
atccatttat ttttatctgg tgttctttgt tttggttttg gagcttttca cgtaactggt	480
atttttggtc ctggtatttg ggtttctgat ccttatggga ttactggaac ggttcaagcc	540
gtagctccgt catgggacgc gacaggattt gatccttata acccagggtgg tatttcagct	600
catcacatag ctgcgggcat tttagggtgta ctagcaggct tattccacct ttgcgttcgc	660
ccgccacaaa gattatacaa tgggtcttcgt atgggaaata ttgaaactgt actgtcaagt	720
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gcagcaacac ctattgaact ttttggtcca actcgttatc aatgggattt aggttttttc	840
caacaagaaa ttgagcgtcg tgtacaaaca aacctttctg aaggtaaadc tgcctcacia	900
gcctgggcag aaatcccaga aaaattagct ttttacgact atattggaaa caaccagca	960
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acattcttcg aaacttttcc tgtagttctt gtagataaag atggtgttgt tcgtgcggat	1140
gttcctttcc gtcgttctga atctaaatac agtattgaac aagttgggggt ttcagtaact	1200
ttctacggtg gtgaattaga tgggtgtaaca tttaatgatc cagcaacagt gaaaaaatat	1260
gctcgacgtg ctcaattagg cgaaattttc gaatttgatc gtgcaactct tcaatcagat	1320
ggtgttttcc gtgcaagccc tcgtgggttg tttacatttg ctcatattatg tttcgctctt	1380
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<211> 1530

<212> DNA

<213> *Porphyra purpurea*

<400> 175

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gcagttcacc taatgcatac cgcacttgta gcagggtggg caggatctat ggcattatac	120
gaattagctg tatttgatcc ttctgatcct gtcttaaatc cgatgtggcg gcaaggaatg	180

SEQUENCE_LISTING_0802US-UTL1_ST25.txt

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gaaattgctg tttttgaccc atcagatcct gttttaaacc caatgtggcg tcaaggtatg	180
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agcgggtgaaa cagcaacaaa tccaggtatt tggagttatg aagggtgtgc tgcattcat	300
attattttat ctggtttatt attcttagct tcggtttggc actgggttta ctgggattta	360
gagttattcc gtgaccaag aactggaaaa actgcattag atttaccaaa aattttcggg	420

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<223> w=a or t

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<222> (1095)..(1095)
<223> w=a or t

<220>
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<222> (1098)..(1098)
<223> y=t or c

<220>
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<222> (1105)..(1105)
<223> n=a or c or t or g

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<222> (1131)..(1131)
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<222> (1140)..(1140)
<223> y=t or c

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<220>
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<223> w=a or t

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<220>
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<220>
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<220>
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 <223> w=a or t

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 <222> (1326)..(1326)
 <223> w=a or t

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 <223> y=t or c

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 <223> y=t or c

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 <222> (1395)..(1395)
 <223> w=a or t

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 <223> w=a or t

<220>
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 <223> m=a or c

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 <223> n=a or c or t or g

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 <222> (1481)..(1481)
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 <223> w=a or t

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 <222> (1504)..(1504)
 <223> w=a or t

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 <222> (1505)..(1505)
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 <223> w=a or t

<220>
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 <223> w=a or t

<220>
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 <223> k=g or t

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kctgtgcayt taatgcayac agcattagtt kcwggttggg cwggwtcwat ggcattwtwc 120

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gaaattgcwg tttttgatcc wtctgatccw gttttaaacc caatgtggcg tcaaggtatg	180
tttgttctgc ctttyatgac acgttttaggt rtmacacaat cttgggggtgg ttggactatt	240
agyggtgaaa cwgcwacaaa tccaggtatt tggagttatg aaggtggtgc wgcagctcac	300
attrtttwtw cwggttttryt attytttagct tcgrtttggc aytgggtwta ytgggattta	360
gaaytwtcc gtgaccamg aactggaaaa mcagcmntag atttaccraa aatttttgggt	420
attcayttat tcttatctgg tctwctatgt tttggttttg gtgctttcca cgtaactgggt	480
ttwtttgggtc ctgggtattg gggttcagat ccttayggat taacaggaag ggttcaacca	540
gtagctcctt cwtgggggtgc tgawggnttt gatccwtwya acccaggtgg tattgcakct	600
caccacatcg ctgctgggtat tttaggtggt ttagcaggtt tattccactt atgtgtwcgt	660
cctyctmwwm gwttatacwt tggtytatsa atgggtarta ttgaaacwgt aytrtcaagt	720
agtattgctg cwgttttctg ggcwgcctty gttgttkcwg gaactatgtg gtaygggtca	780
gcagctacwc cwattgaayt atttgggtcca actcggtayc aatgggayca aggttttyttc	840
caacaagaaa ttsaaaaacg wgtacaaaca agtttwgctg awggtgcwtc wcyatctgaw	900
gcttggtcra raattccaga aaaattagct ttytatgatt atattggwaa yaacccwgc	960
aaaggyggtg twttccgtrc tgggtgctatg aayagtggag atggtattgc tgtwgggttg	1020
ttaggtcacg cagtattcaa agatmaagaa ggtmgcgart tattcgtwgc tcgtatgccw	1080
acattctttg aaacwtttcc agttntttta gtagataaag atggtrttgt wcggtctgay	1140
gttcctttcc gtmwgwtga atctaaatat agtattgaac aagttgggtg atcagtwact	1200
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gctcgwaaag cwcaattagg tgaaatTTTT gaatttgatc gttcaacttt acaatcwgt	1320
ggtgtwtcc gtagtagccc acgtgggttg tttacwtttg gtcaygtatg ytttgcttta	1380
ttattcttct ttggwcatat ttggcatggt gctcgtaaa tcttccwga tgtatttgct	1440
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 <212> DNA
 <213> Chlamydomonas reinhardtii

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ttaccaggct ggggtacaac tgttttaatg gctgtattta tccttttatt tgcagcattc	180
ttattaatca ttttagaaat ttacaacagt tctttaattt tagatgacgt ttctatgagt	240
tgggaaactt tagctaaaagt ttcttaa	267

<210> 179
 <211> 243

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<212> DNA
 <213> *Chlorella vulgaris*

<400> 179
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 acagtgttaa tgggaatttt tatggcatta ttgcccgttt tccttgtaat tatcttagaa 180
 atttataaca gttcagtact tcttgatgac gttacaatga gttgggaatc tttatctaaa 240
 taa 243

<210> 180
 <211> 204
 <212> DNA
 <213> *Porphyr a purpurea*

<400> 180
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 gttgctccag gttggggtag aactcctatt atgggaattt tcatgttatt atttttctta 120
 tttttattaa taattttaca aatatataat tcatcactag tgctagaaaa ttagatgta 180
 gattgggcta ctttaggaag ctaa 204

<210> 181
 <211> 261
 <212> DNA
 <213> *Scenedesmus obliquus*

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 ttacctggat ggggaacaac tgttttaatg ggtgttttca ttgtactttt tgctgtattc 180
 ttattaatta ttttagaaat ttataacagt tctttattat tagatgatgt tactatgagt 240
 tgggaaactt tagcttctta a 261

<210> 182
 <211> 253
 <212> DNA
 <213> artificial sequence

<220>
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 <223> m=a or c

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<222> (53)..(53)
<223> n=a or c or t or g

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<222> (58)..(58)
<223> w=a or t

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<223> w=a or t

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<223> y=t or c

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<223> w=a or t

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<223> y=t or c

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<222> (103)..(103)
<223> w=a or t

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<223> k=g or t

<220>
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<222> (111)..(111)
<223> y=t or c

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<223> w=a or t

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<222> (124)..(124)
<223> w=a or t

<220>
<221> misc_feature
<222> (142)..(142)
<223> w=a or t

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<222> (143)..(143)
<223> r=g or a

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<223> y=t or c

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<223> w=a or t

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<222> (206)..(206)
<223> n=a or c or t or g

<220>
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<223> y=t or c

<220>
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<222> (217)..(217)
<223> y=t or c

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tccattagga actttwttaa gaccaytwaa ytcagaatmm ggwaaagtak yaccwggctg      120
gggwacaact gttttaatgg gwrTTTTtYat ggtattatTTT gccgtattct tattaattat      180
tttagaaatt tataacagtt cwtTanttyt agatgaygtt actatgagtt gggaaacttt      240
agctaaatct taa                                                              253

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