

SEQUENCE LISTING

<110> Firmenich SA

<120> Method for producing (+)-alpha-santalene

<130> 7280

<160> 43

<170> PatentIn version 3.5

<210> 1

<211> 551

<212> PRT

<213> Clausena lansium

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Leu	Arg	Leu	Ile	Asp	Thr	Val	Gln	Arg	Leu	Gly	Val	Ala	Tyr	His	Phe
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Val Ser Asn Ser Pro Val Asn Ser Thr Phe Ala Glu Gln Ile Arg His
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Ser Leu Arg Val Pro Leu Arg Lys Ala Val Pro Arg Leu Glu Ser Arg
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Tyr Phe Leu Asp Ile Tyr Ser Arg Asp Asp Leu His Asp Lys Thr Leu
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Leu Asn Phe Ala Lys Leu Asp Phe Asn Ile Leu Gln Ala Met His Gln
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Lys Glu Ala Ser Glu Met Thr Arg Trp Trp Arg Asp Phe Asp Phe Leu
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Lys Lys Leu Pro Tyr Ile Arg Asp Arg Val Val Glu Leu Tyr Phe Trp
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Ile Leu Val Gly Val Ser Tyr Gln Pro Lys Phe Ser Thr Gly Arg Ile
275 280 285

Phe Leu Ser Lys Ile Ile Cys Leu Glu Thr Leu Val Asp Asp Thr Phe
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Asp Ala Tyr Gly Thr Phe Asp Glu Leu Ala Ile Phe Thr Glu Ala Val
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Thr Arg Trp Asp Leu Gly His Arg Asp Ala Leu Pro Glu Tyr Met Lys
325 330 335

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Leu Ala Lys Glu Gly Arg Ser Tyr Ser Ile His Tyr Ala Ile Arg Ser
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Phe Gln Glu Leu Val Met Lys Tyr Phe Cys Glu Ala Lys Trp Leu Asn
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Lys Gly Tyr Val Pro Ser Leu Asp Asp Tyr Lys Ser Val Ser Leu Arg
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Ser Ile Gly Phe Leu Pro Ile Ala Val Ala Ser Phe Val Phe Met Gly
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Asp Ile Ala Thr Lys Glu Val Phe Glu Trp Glu Met Asn Asn Pro Lys
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Ile Ile Ile Ala Ala Glu Thr Ile Phe Arg Phe Leu Asp Asp Ile Ala
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Gly His Arg Phe Glu Gln Lys Arg Glu His Ser Pro Ser Ala Ile Glu
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35 40 45

Lys Glu Gly Arg Ser Tyr Ser Ile Gln Tyr Ala Ile Arg Ser Phe Gln
50 55 60

Glu Leu Ala Met Lys Tyr Phe Cys Glu Ala Glu Trp Leu Asn Lys Gly
65 70 75 80

Tyr Val Pro Ser Leu Asp Glu Tyr Lys Ser Val Ser Val Arg Ser Val
85 90 95

Gly Phe Phe Pro Ile Ala Val Ala Ser Phe Val Phe Met Gly Asp Ile
100 105 110

Ala Thr Lys Glu Val Phe Glu Trp Glu Met Asn Asn Pro Lys Ile Ile
115 120 125

Ile Ala Ala Glu Thr Ile Phe Arg Phe Leu Asp Asp Ala Ala Gly His
130 135 140

Lys Phe Glu Gln Lys Arg Glu His Cys Pro Ser Ala Ile Glu Cys Tyr
145 150 155 160

Lys Asn Gln His Gly Val Ser Glu Glu Glu Ala Val Lys Ala Leu Ser
165 170 175

Leu Glu Val Ala Asn Ser Trp Lys Asp Ile Asn Glu Glu Leu Leu Leu
180 185 190

Asn Pro Met Ala Ile Pro Leu Pro Leu Leu Gln Val Ile Leu Asp Leu
195 200 205

Ser Arg Ser Ala Asp Phe Met Tyr Gly Asn Gly Gln Asp Arg Tyr Thr
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His Ser Thr Met Met Lys Asp Gln Val Asp Leu Val Leu Lys Asp Pro
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Val Lys Leu Asp Asp
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Lys Glu Gly Arg Ser Tyr Ser Ile Gln Tyr Ala Ile Arg Ser Phe Gln
50 55 60

Glu Leu Val Met Lys Tyr Phe Cys Glu Ala Lys Trp Leu Asn Lys Gly
65 70 75 80

Tyr Val Pro Ser Leu Asp Asp Tyr Lys Ser Val Ser Leu Arg Ser Ile
85 90 95

Gly Phe Leu Pro Ile Ala Val Ala Ser Phe Val Phe Met Gly Asp Ile
100 105 110

Ala Thr Lys Glu Val Phe Glu Trp Glu Met Asn Asn Pro Lys Ile Ile
115 120 125

Ile Ala Ala Glu Thr Ile Phe Arg Phe Leu Asp Asp Ile Ala Gly His
130 135 140

Lys Phe Glu Gln Lys Arg Glu His Ser Pro Ser Ala Ile Glu Cys Tyr
145 150 155 160

Lys Asn Gln His Gly Val Ser Glu Glu Glu Ala Val Lys Ala Leu Ser
165 170 175

Leu Glu Val Ala Asn Ser Trp Lys Asp Ile Asn Glu Glu Leu Leu Leu
180 185 190

Asn Pro Met Ala Ile Pro Leu Pro Leu Leu Gln Val Ile Leu Asp Leu
195 200 205

Ser Arg Ser Ala Asp Phe Met Tyr Gly Asn Ala Gln Asp Arg Phe Thr
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His Ser Thr Met Met Lys Asp Gln Val Asp Leu Val Leu Lys Asp Pro
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Val Lys Leu Asp Asp
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 <213> Clausena lansium

<400> 29

Met	Ser	Thr	Gln	Gln	Val	Ser	Ser	Glu	Asn	Ile	Val	Arg	Asn	Ala	Ala
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Asp	Phe	His	Pro	Asn	Ile	Trp	Gly	Asn	His	Phe	Leu	Thr	Cys	Leu	Ser	20	25	30
Gln	Thr	Ile	Asp	Ser	Trp	Thr	Gln	Gln	His	His	Lys	Glu	Leu	Lys	Glu	35	40	45
Glu	Val	Arg	Lys	Met	Met	Val	Ser	Asp	Ala	Asn	Lys	Pro	Ala	Gln	Arg	50	55	60
Leu	Arg	Leu	Ile	Asp	Thr	Val	Gln	Arg	Leu	Gly	Val	Ala	Tyr	His	Phe	65	70	75
Glu	Lys	Glu	Ile	Asp	Asp	Ala	Leu	Glu	Lys	Ile	Gly	His	Asp	Pro	Phe	85	90	95
Asp	Asp	Lys	Asp	Asp	Leu	Tyr	Ile	Val	Ser	Leu	Cys	Phe	Arg	Leu	Leu	100	105	110
Arg	Gln	His	Gly	Ile	Lys	Ile	Ser	Cys	Asp	Val	Phe	Glu	Lys	Phe	Lys	115	120	125
Asp	Asp	Asp	Gly	Lys	Phe	Lys	Ala	Ser	Leu	Met	Asn	Asp	Val	Gln	Gly	130	135	140
Met	Leu	Ser	Leu	Tyr	Glu	Ala	Ala	His	Leu	Ala	Ile	His	Gly	Glu	Asp	145	150	155
Ile	Leu	Asp	Glu	Ala	Ile	Val	Phe	Thr	Thr	Thr	His	Leu	Lys	Ser	Thr	165	170	175
Val	Ser	Asn	Ser	Pro	Val	Asn	Ser	Thr	Phe	Ala	Glu	Gln	Ile	Arg	His	180	185	190
Ser	Leu	Arg	Val	Pro	Leu	Arg	Lys	Ala	Val	Pro	Arg	Leu	Glu	Ser	Arg	195	200	205
Tyr	Phe	Leu	Asp	Ile	Tyr	Ser	Arg	Asp	Asp	Leu	His	Asp	Lys	Thr	Leu	210	215	220
Leu	Asn	Phe	Ala	Lys	Ser	Asp	Phe	Asn	Ile	Leu	Gln	Ala	Met	His	Gln	225	230	235
Lys	Glu	Ala	Ser	Glu	Met	Thr	Arg	Trp	Trp	Arg	Asp	Phe	Asp	Phe	Leu	245	250	255

Lys Lys Leu Pro Tyr Ile Arg Asp Arg Val Val Glu Leu Tyr Phe Trp
260 265 270

Ile Leu Val Gly Val Ser Tyr Gln Pro Lys Phe Ser Thr Gly Arg Ile
275 280 285

Phe Leu Ser Lys Ile Ile Cys Leu Glu Thr Leu Val Asp Asp Thr Phe
290 295 300

Asp Ala Tyr Gly Thr Phe Asp Glu Leu Thr Ile Phe Thr Glu Ala Val
305 310 315 320

Thr Arg Trp Asp Ile Gly His Arg Asp Ala Leu Pro Glu Tyr Met Lys
325 330 335

Phe Ile Phe Lys Thr Leu Ile Asp Val Tyr Ser Glu Ala Glu Gln Glu
340 345 350

Leu Ala Lys Glu Gly Arg Ser Tyr Ser Ile Gln Tyr Ala Ile Arg Ser
355 360 365

Phe Gln Glu Leu Val Met Lys Tyr Phe Cys Glu Ala Lys Trp Leu Asn
370 375 380

Lys Gly Tyr Val Pro Ser Leu Asp Asp Tyr Lys Ser Val Ser Leu Arg
385 390 395 400

Ser Ile Gly Phe Leu Pro Ile Ala Val Ala Ser Phe Val Phe Met Gly
405 410 415

Asp Ile Ala Thr Lys Glu Val Phe Glu Trp Glu Met Asn Asn Pro Lys
420 425 430

Ile Ile Ile Ala Ala Glu Thr Ile Phe Arg Phe Leu Asp Asp Ile Ala
435 440 445

Gly His Lys Phe Glu Gln Lys Arg Glu His Ser Pro Ser Ala Ile Glu
450 455 460

Cys Tyr Lys Asn Gln His Gly Val Ser Glu Glu Glu Ala Val Lys Ala
465 470 475 480

Leu Ser Leu Glu Val Ala Asn Ser Trp Lys Asp Ile Asn Glu Glu Leu
485 490 495

Leu Leu Asn Pro Met Ala Ile Pro Leu Pro Leu Leu Gln Val Ile Leu

500

505

510

Asp Leu Ser Arg Ser Ala Asp Phe Met Tyr Gly Asn Ala Gln Asp Arg
 515 520 525

Phe Thr His Ser Thr Met Met Lys Asp Gln Val Asp Leu Val Leu Lys
 530 535 540

Asp Pro Val Lys Leu Asp Asp
 545 550

<210> 30
 <211> 1368
 <212> DNA
 <213> Clausena lansium

<220>
 <221> misc_feature
 <222> (1346)..(1346)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (1357)..(1357)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (1362)..(1362)
 <223> n is a, c, g, or t

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 ctctcagagt tcctctccat aaagccttac ctaggttaga atcgaggtat ttcttgata 120
 tctattcaag agacgatttg cacgataaaa ctttgctcaa ttctgcgaag ttagacttta 180
 atatactaca agtaatgcac cagaaggaag caagtgagat gaccaggtgg tggagagatt 240
 ttgacttcct taaaaagctg cttatataa gagacagagt cgtggagcta tatttttgga 300
 ttctggtggg agtgtcttat cagcccaa ttagcactgg tagaattttt ttgtccaaa 360
 taatatgcct tgagaccctc gtagatgata catttgacgc ctacgttact tttgacgagc 420
 tcacaatctt tactgaagca gttacaagat gggacattgg ccacagagat gcactaccag 480
 aatacatgaa attcattttc aagacactca ttgatgtcta cagtgaagct gagcaagaac 540
 tggcaaagga agggagatca tacagcatac aatatgcaat acggtcgttc caagaactag 600
 ttatgaagta cttctgcgaa gccaaagtgg taaataaagg ttatgttccg agcctggacg 660
 attataaatc agtttcatta agaagtatcg gttttttacc gatagcggta gcttccttcg 720

ttttcatggg tgatattgca actaaggagg tctttgaatg ggaaatgaat aaccctaaga	780
tcataatagc cgcagaaacg attttcagat tcctggatga catagcaggc cataagtttg	840
agcaaaagag agaacatagt ccatcagcta ttgaatgcta caagaatcaa catggagtgt	900
ctgaggaaga ggcagttaaa gcgttgtcgt tagaagttgc taatagttgg aaagatataa	960
atgaggagct gcttctcaac ccaatggcta ttcctttacc tctgcttcag gtgattcttg	1020
atctctcacg ttcggccgat tttatgtacg gtaatgctca agatcgcttc acgcattcaa	1080
cgatgatgaa agaccaagtt gatttgggtgc tgaaggaccc cgttaagctt gacgattaaa	1140
gttatgttgc tgatttccta tcgtatatatt gagaagttgg taataaatta agttgggtgt	1200
tgctagttat ttagctagct agtcatgctg agctagggga tggttcaatt gattaggcct	1260
atattctagt aaaaataaac gatgtaagaa caaatctccc tcgcaccaac ttcgcaataa	1320
tgtaatttat ttcattctatg tctatngcag gggtcanaac cnaaaaaa	1368

<210> 31
 <211> 1372
 <212> DNA
 <213> Clausena lansium

<220>
 <221> misc_feature
 <222> (1356)..(1356)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (1366)..(1366)
 <223> n is a, c, g, or t

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ctctcagagt tcctctccgt aaagctgtac ctaggttaga gtcgaggtat ttcttggata	120
tctattcaag agatgatttg cacgataaaa ctttgctcaa tttcgcaaag ttagacttta	180
atatactaca agcaatgcac cagaaggaag caagtgagat aaccaggtgg tggagagatt	240
ttggattcct tgaaaagctg ccttatgtaa gagacagaat cgtggagata tatttttggga	300
tattgggtggg atggctctat gagccaaaat tcagcactgg tagaatcatt ttgtccaaaa	360
tattatgcct cgtgtccctt gtagatgata catttgacgc ctatggtact cttgaagagc	420
tcacagtctt tactgaagca attacaagat gggacattgg ccacacagat gcactaccag	480
attacatgaa attccttttc aagacactca ttgatgtcta tagtgaagct gaggaagaac	540
tggcaaaggg aggaagatca tacagcatac aatatgcaat acgatcgttt caagaactag	600
ctatgaaata cttctgcgaa gcggagtggg taaataaagg ttatgttccg agcctggacg	660

agtataaatc agtttcagta agaagtgtcg gtttttttcc gatagcggta gcttccttcg	720
ttttcatggg tgatattaca actaaggagg tctttgaatg ggaaatgaat aaccctaaga	780
tcataatagc cgcagaaacg attttcagat tcctggatga tgtggcaggc cataagtttg	840
agcaaaagag agaacattgt ccatcagcta ttgaatgcta caagaatcaa catggagtgt	900
ctgaggaaga ggcagttaaa gcgttgtcgt tagaagttgc taatagttgg aaagatataa	960
atgaggagct gcttctcaac ccaatggcta ttcctttacc tctacttcag gtgattcttg	1020
atctctcacg ttcggccgat tttatgtacg gcaatggta agatcgctac acgcattcaa	1080
cgatgatgaa agaccaagtt gacttgggtgc tgaaggacce cgttaagctt gacgattaaa	1140
gttatgttgc tgatttccta ttgtatattt gagaagttgg taataaatta agttgggtgct	1200
tgctagttat ttagctagct agtcatgcgt agctaaggga tggttcaatt gattaggcct	1260
atattctagt aaaaataaaa ggtgtaagaa cgaatctccc tcacaccaac ttcgcaataa	1320
tgtaatttat ttcattctatg tctgttacia aaattngaga taaaanaaca gc	1372

<210> 32
 <211> 31
 <212> DNA
 <213> Artificial sequence

<220>
 <223> Primer

<400> 32	
caccatgtca actcaacaag tttcatcaga g	31

<210> 33
 <211> 27
 <212> DNA
 <213> Artificial sequence

<220>
 <223> Primer

<400> 33	
actttaatcg tcaagcttaa cggggtc	27

<210> 34
 <211> 30
 <212> DNA
 <213> Artificial

<220>
 <223> Primer

<400> 34	
ctagccatgg cttcagaaaa agaaattagg	30

<210> 35
 <211> 40
 <212> DNA
 <213> Artificial

 <220>
 <223> primer

 <400> 35
 ccggaattcc tatttgcttc tcttgtaaac tttgttcaag 40

 <210> 36
 <211> 42
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 36
 aaggagatat acatatgaca aaaaaagttg gtgtcgggtca gg 42

 <210> 37
 <211> 43
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 37
 ctttaccaga ctcgagttac gccttttttca tctgatacctt tgc 43

 <210> 38
 <211> 1656
 <212> DNA
 <213> Clausena lansium

 <400> 38
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 aatatatggg gaaaccattt cctcacatgt ccttctcaga cgattgatag ttggactcaa 120
 cagcaccaca aagaactgaa agaagaggtg aggaaaatga tgggtgtctga tgcaaataaa 180
 cctgcccaga gattgCGctt gattgatact gtccaaaggT taggtgtggc ttaccacttt 240
 gaaaaggaga ttgatgatgc attggagaaa atagggtcatg accctttttga tgataaagat 300
 gatctctaca ttgtctctct ttgttttcga ttgctgaggc agcatggaat taagatatca 360
 tgtgatgtgt ttgagaagtt taaagatgac gatggaaaat tcaaggcatc attgatgaat 420
 gatgttcaag gcatgctaag tttatatgag gcagcacacc tagccattca cggagaagat 480
 attttagatg aagcaattgt tttcacgacc actcacctta agtcaacggt atctaattct 540

cctgtaaact ctacttttgc tgaacaaata cgtcattctc tcagagttcc tctccgtaaa	600
gctgtacctt ggtagagtc gaggtatttc ttggatatct attcaagaga tgatttgcac	660
gataaaactt tgctcaattt cgcaaagtta gactttaata tactacaagc aatgcaccag	720
aaggaagcaa gtgagatgac caggtggtgg agagattttg acttccttaa aaagctgcct	780
tatataagag acagagtcgt ggagctatat ttttggattc tgggtgggagt gtcttatcag	840
cccaaattca gcactggtag aatttttttg tccaaaataa tatgccttga gaccctcgta	900
gatgatacat ttgacgccta cgggtactttt gacgagctca caatctttac tgaagcagtt	960
acaagatggg acattggcca cagagatgca ctaccagaat acatgaaatt cattttcaag	1020
acactcattg atgtctacag tgaagctgag caagaactgg caaaggaagg gagatcatac	1080
agcatacaat atgcaatacg atcgttccaa gaactagtta tgaagtactt ctgcgaagcc	1140
aagtgggtta ataaagggtt tgttccgagc ctggacgatt ataaatcagt ttcattaaga	1200
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aaggaggtct ttgaatggga aatgaataac cctaagatca taatagccgc agaaacgatt	1320
ttcagattcc tggatgacat agcaggccat aagtttgagc aaaagagaga acatagtcca	1380
tcagctattg aatgctacaa gaatcaacat ggagtgtctg aggaagaggc agttaaagcg	1440
ttgtcgttag aagttgctaa tagttgaaa gatataaatg aggagctgct tctcaaccca	1500
atggctattc ctttacctct gcttcagggtg attcttgatc tctcacgttc ggccgatttt	1560
atgtacggtg atgtctcaaga tcgcctcacg cattcaacga tgatgaaaga ccaagttgat	1620
ttggtgctga aggaccccg taaagcttgac gattag	1656

<210> 39
 <211> 1656
 <212> DNA
 <213> Clausena lansium

<400> 39	
atgtcaactc aacaagtttc atcagagaac attgttcgta acgctgcgaa tttccatcct	60
aatatatggg gaaaccattt cctcacatgt ccttctcaga cgattgatag ttggactcaa	120
cagcaccaca aagaactgaa agaagagggtg aggaaaatga tgggtgtctga tgcaaataaa	180
cctgcccaga gattgcgctt gattgatact gtccaaaggt taggtgtggc ttaccacttt	240
gaaaaggaga ttgatgatgc attggagaaa ataggtcatg acccttttga tgataaagat	300
gatctctaca ttgtctctct ttgttttcga ttgctgaggc agcatggaat taagatatca	360
tgtgatgtgt ttgagaagtt taaagatgac gatggaaaat tcaaggcatc attgatgaat	420
gatgttcaag gcatgctaag tttatatgag gcagcacacc tagccattca cggagaagat	480

atthtagatg aagcaattgt tttcacgacc actcacctta agtcaacggt atctaattct	540
cctgtaaaact ctacttttgc tgaacaaata cgtcattctc tcagagttcc tctccgtaaa	600
gctgtacctt ggtagagtc gaggtatttc ttggatatct attcaagaga tgatttgcac	660
gataaaactt tgctcaattt cgcaaagtta gactttaata tactacaagc aatgcaccag	720
aaggaagcaa gtgagatgac caggtggtgg agagattttg acttccttaa aaagctgcct	780
tatataagag acagagtcgt ggagctatat ttttggattc tgggtgggagt gtcttatcac	840
cccaaattca gcaactgtag aatthttttt tccaaaataa tatgccttga gaccctcgta	900
gatgatacat ttgacgccta cggtagcttt gacgagctca caatctttac tgaagcagtt	960
acaagatggg acattggcca cagagatgca ctaccagaat acatgaaatt cattttcaag	1020
acactcattg atgtctacag tgaagctgag caagaactgg caaaggaagg gagatcatac	1080
agcatacaat atgcaatacg atcgttccaa gaactagtta tgaagtactt ctgcgaagcc	1140
aagtggttaa ataaaggtta tgttccgagc ctggacgatt ataaatcagt ttcattaaga	1200
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aaggaggtct ttgaatggga aatgaataac cctaagatca taatagccgc agaaacgatt	1320
ttcagattcc tggatgacat agcaggccat aagtttgagc aaaagagaga acatagtcca	1380
tcagctattg aatgctacaa gaatcaacat ggagtgtctg aggaagaggc agttaaaagcg	1440
ttgtcgttag aagttgctaa tagttggaaa gatataaatg aggagctgct tctcaaccca	1500
atggctattc ctttacctct gcttcaggtg attcttgatc tctcacgttc ggccgatttt	1560
atgtacggtt atgtcaaga tcgcctcacg cattcaacga tgatgaaaga ccaagttgat	1620
ttggtgctga aggaccccg taaagcttgac gattag	1656

<210> 40
 <211> 1656
 <212> DNA
 <213> Clausena lansium

<400> 40	
atgtcaactc aacaagtttc atcagagaac attgttcgta acgctgcgaa tttcatcct	60
aatatatggg gaaaccattt cctcacatgt ctttctcaga cgattgatag ttggactcaa	120
cagcaccaca aagaactgaa agaagaggtg agggaaatga tgggtgtctga tgcaaataaa	180
cctgcccaga gattgcgctt gattgatact gtccaaaggc taggtgtggc ttaccacttt	240
gaaaaggaga ttgatgatgc attggagaaa ataggtcatg acccttttga tgataaagat	300
gatctctaca ttgtctctct ttgttttcga ttgctgaggc agcatggaat taagatatca	360
tgtgatgtgt ttgagaagtt taaagatgac gatggaaaat tcaaggcatc attgatgaat	420

gatgttcaag gcatgctaag tttatatgag gcagcacacc tagccattca cggagaagat	480
atthtagatg aagcaattgt tttcacgacc actcacctta agtcaacggg atctaattct	540
cctgtaaact ctacttttgc tgaacaaata cgtcattctc tcagagttcc tctccgtaaa	600
gctgtaccta ggtagagtc gaggtatttc ttggatatct attcaagaga tgatttgcac	660
gataaaactt tgctcaattt cgcaaagtta gactttaata tactacaagc aatgcaccag	720
aaggaagcaa gtgagatgac caggtggtgg agagattttg acttccttaa aaagctgcct	780
tatataagag acagagtcgt ggagctatat ttttggttc tgggtgggagt gtcttatcag	840
cccaaattca gcaactgtag aatthttttg tccaaaataa tatgccttga gaccctcgta	900
gatgatacat ttgacgccta cggtagcttt gacgagctca caatctttac tgaagcagtt	960
acaagatggg acattggcca cagagatgca ctaccagaat acatgaaatt cattttcaag	1020
acactcattg atgtctacag tgaagctgag caagaactgg caaaggaagg gagatcatac	1080
agcatacaat atgcaatacg atcgttccaa gaactagtta tgaagtactt ctgcgaagcc	1140
aagtggttaa ataaaggtta tgttccgagc ctggacgatt ataatcagt ttcattaaga	1200
agtatcggtt ttttaccgat agcggtagct tccttcgttt tcatgggtga tattgcaact	1260
aaggaggtct ttgaatggga aatgaataac cctaagatca taatagccgc agaaacgatt	1320
ttcagattcc tggatgacat agcaggccat aagtttgagc aaaagagaga acatagtcca	1380
tcagctattg aatgctacaa gaatcaacat ggagtgtctg aggaagaggc agttaagcg	1440
ttgtcgtag aagttgctaa tagttggaaa gatataaatg aggagctgct tctcaaccca	1500
atggctattc ctttacctct gcttcaggtg attcttgatc tctcacgttc ggccgatttt	1560
atgtacggtg atgctcaaga tcgcttcacg cattcaacga tgatgaaaga ccaagttgat	1620
ttggtgctga aggaccccg taaagcttgac gattaa	1656

<210> 41
 <211> 551
 <212> PRT
 <213> Clausena lansium

<400> 41

Met	Ser	Thr	Gln	Gln	Val	Ser	Ser	Glu	Asn	Ile	Val	Arg	Asn	Ala	Ala
1				5					10					15	

Asn	Phe	His	Pro	Asn	Ile	Trp	Gly	Asn	His	Phe	Leu	Thr	Cys	Pro	Ser
		20					25						30		

Gln	Thr	Ile	Asp	Ser	Trp	Thr	Gln	Gln	His	His	Lys	Glu	Leu	Lys	Glu
		35					40					45			

Glu Val Arg Lys Met Met Val Ser Asp Ala Asn Lys Pro Ala Gln Arg
50 55 60

Leu Arg Leu Ile Asp Thr Val Gln Arg Leu Gly Val Ala Tyr His Phe
65 70 75 80

Glu Lys Glu Ile Asp Asp Ala Leu Glu Lys Ile Gly His Asp Pro Phe
85 90 95

Asp Asp Lys Asp Asp Leu Tyr Ile Val Ser Leu Cys Phe Arg Leu Leu
100 105 110

Arg Gln His Gly Ile Lys Ile Ser Cys Asp Val Phe Glu Lys Phe Lys
115 120 125

Asp Asp Asp Gly Lys Phe Lys Ala Ser Leu Met Asn Asp Val Gln Gly
130 135 140

Met Leu Ser Leu Tyr Glu Ala Ala His Leu Ala Ile His Gly Glu Asp
145 150 155 160

Ile Leu Asp Glu Ala Ile Val Phe Thr Thr Thr His Leu Lys Ser Thr
165 170 175

Val Ser Asn Ser Pro Val Asn Ser Thr Phe Ala Glu Gln Ile Arg His
180 185 190

Ser Leu Arg Val Pro Leu Arg Lys Ala Val Pro Arg Leu Glu Ser Arg
195 200 205

Tyr Phe Leu Asp Ile Tyr Ser Arg Asp Asp Leu His Asp Lys Thr Leu
210 215 220

Leu Asn Phe Ala Lys Leu Asp Phe Asn Ile Leu Gln Ala Met His Gln
225 230 235 240

Lys Glu Ala Ser Glu Met Thr Arg Trp Trp Arg Asp Phe Asp Phe Leu
245 250 255

Lys Lys Leu Pro Tyr Ile Arg Asp Arg Val Val Glu Leu Tyr Phe Trp
260 265 270

Ile Leu Val Gly Val Ser Tyr Gln Pro Lys Phe Ser Thr Gly Arg Ile
275 280 285

Phe Leu Ser Lys Ile Ile Cys Leu Glu Thr Leu Val Asp Asp Thr Phe
290 295 300

Asp Ala Tyr Gly Thr Phe Asp Glu Leu Thr Ile Phe Thr Glu Ala Val
305 310 315 320

Thr Arg Trp Asp Ile Gly His Arg Asp Ala Leu Pro Glu Tyr Met Lys
325 330 335

Phe Ile Phe Lys Thr Leu Ile Asp Val Tyr Ser Glu Ala Glu Gln Glu
340 345 350

Leu Ala Lys Glu Gly Arg Ser Tyr Ser Ile Gln Tyr Ala Ile Arg Ser
355 360 365

Phe Gln Glu Leu Val Met Lys Tyr Phe Cys Glu Ala Lys Trp Leu Asn
370 375 380

Lys Gly Tyr Val Pro Ser Leu Asp Asp Tyr Lys Ser Val Ser Leu Arg
385 390 395 400

Ser Ile Gly Phe Leu Pro Ile Ala Val Ala Ser Phe Val Phe Met Gly
405 410 415

Asp Ile Ala Thr Lys Glu Val Phe Glu Trp Glu Met Asn Asn Pro Lys
420 425 430

Ile Ile Ile Ala Ala Glu Thr Ile Phe Arg Phe Leu Asp Asp Ile Ala
435 440 445

Gly His Lys Phe Glu Gln Lys Arg Glu His Ser Pro Ser Ala Ile Glu
450 455 460

Cys Tyr Lys Asn Gln His Gly Val Ser Glu Glu Glu Ala Val Lys Ala
465 470 475 480

Leu Ser Leu Glu Val Ala Asn Ser Trp Lys Asp Ile Asn Glu Glu Leu
485 490 495

Leu Leu Asn Pro Met Ala Ile Pro Leu Pro Leu Leu Gln Val Ile Leu
500 505 510

Asp Leu Ser Arg Ser Ala Asp Phe Met Tyr Gly Asn Ala Gln Asp Arg
515 520 525

Leu Thr His Ser Thr Met Met Lys Asp Gln Val Asp Leu Val Leu Lys

530

535

540

Asp Pro Val Lys Leu Asp Asp
545 550

<210> 42

<211> 551

<212> PRT

<213> Clausena lansium

<400> 42

Met Ser Thr Gln Gln Val Ser Ser Glu Asn Ile Val Arg Asn Ala Ala
1 5 10 15

Asn Phe His Pro Asn Ile Trp Gly Asn His Phe Leu Thr Cys Pro Ser
20 25 30

Gln Thr Ile Asp Ser Trp Thr Gln Gln His His Lys Glu Leu Lys Glu
35 40 45

Glu Val Arg Lys Met Met Val Ser Asp Ala Asn Lys Pro Ala Gln Arg
50 55 60

Leu Arg Leu Ile Asp Thr Val Gln Arg Leu Gly Val Ala Tyr His Phe
65 70 75 80

Glu Lys Glu Ile Asp Asp Ala Leu Glu Lys Ile Gly His Asp Pro Phe
85 90 95

Asp Asp Lys Asp Asp Leu Tyr Ile Val Ser Leu Cys Phe Arg Leu Leu
100 105 110

Arg Gln His Gly Ile Lys Ile Ser Cys Asp Val Phe Glu Lys Phe Lys
115 120 125

Asp Asp Asp Gly Lys Phe Lys Ala Ser Leu Met Asn Asp Val Gln Gly
130 135 140

Met Leu Ser Leu Tyr Glu Ala Ala His Leu Ala Ile His Gly Glu Asp
145 150 155 160

Ile Leu Asp Glu Ala Ile Val Phe Thr Thr Thr His Leu Lys Ser Thr
165 170 175

Val Ser Asn Ser Pro Val Asn Ser Thr Phe Ala Glu Gln Ile Arg His
180 185 190

Ser Leu Arg Val Pro Leu Arg Lys Ala Val Pro Arg Leu Glu Ser Arg
195 200 205

Tyr Phe Leu Asp Ile Tyr Ser Arg Asp Asp Leu His Asp Lys Thr Leu
210 215 220

Leu Asn Phe Ala Lys Leu Asp Phe Asn Ile Leu Gln Ala Met His Gln
225 230 235 240

Lys Glu Ala Ser Glu Met Thr Arg Trp Trp Arg Asp Phe Asp Phe Leu
245 250 255

Lys Lys Leu Pro Tyr Ile Arg Asp Arg Val Val Glu Leu Tyr Phe Trp
260 265 270

Ile Leu Val Gly Val Ser Tyr His Pro Lys Phe Ser Thr Gly Arg Ile
275 280 285

Phe Leu Ser Lys Ile Ile Cys Leu Glu Thr Leu Val Asp Asp Thr Phe
290 295 300

Asp Ala Tyr Gly Thr Phe Asp Glu Leu Thr Ile Phe Thr Glu Ala Val
305 310 315 320

Thr Arg Trp Asp Ile Gly His Arg Asp Ala Leu Pro Glu Tyr Met Lys
325 330 335

Phe Ile Phe Lys Thr Leu Ile Asp Val Tyr Ser Glu Ala Glu Gln Glu
340 345 350

Leu Ala Lys Glu Gly Arg Ser Tyr Ser Ile Gln Tyr Ala Ile Arg Ser
355 360 365

Phe Gln Glu Leu Val Met Lys Tyr Phe Cys Glu Ala Lys Trp Leu Asn
370 375 380

Lys Gly Tyr Val Pro Ser Leu Asp Asp Tyr Lys Ser Val Ser Leu Arg
385 390 395 400

Ser Ile Gly Phe Leu Pro Ile Ala Val Ala Ser Phe Val Phe Met Gly
405 410 415

Asp Ile Ala Thr Lys Glu Val Phe Glu Trp Glu Met Asn Asn Pro Lys
420 425 430

Ile Ile Ile Ala Ala Glu Thr Ile Phe Arg Phe Leu Asp Asp Ile Ala
435 440 445

Gly His Lys Phe Glu Gln Lys Arg Glu His Ser Pro Ser Ala Ile Glu
450 455 460

Cys Tyr Lys Asn Gln His Gly Val Ser Glu Glu Glu Ala Val Lys Ala
465 470 475 480

Leu Ser Leu Glu Val Ala Asn Ser Trp Lys Asp Ile Asn Glu Glu Leu
485 490 495

Leu Leu Asn Pro Met Ala Ile Pro Leu Pro Leu Leu Gln Val Ile Leu
500 505 510

Asp Leu Ser Arg Ser Ala Asp Phe Met Tyr Gly Asn Ala Gln Asp Arg
515 520 525

Leu Thr His Ser Thr Met Met Lys Asp Gln Val Asp Leu Val Leu Lys
530 535 540

Asp Pro Val Lys Leu Asp Asp
545 550

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<213> Clausena lansium

<400> 43

Met Ser Thr Gln Gln Val Ser Ser Glu Asn Ile Val Arg Asn Ala Ala
1 5 10 15

Asn Phe His Pro Asn Ile Trp Gly Asn His Phe Leu Thr Cys Pro Ser
20 25 30

Gln Thr Ile Asp Ser Trp Thr Gln Gln His His Lys Glu Leu Lys Glu
35 40 45

Glu Val Arg Lys Met Met Val Ser Asp Ala Asn Lys Pro Ala Gln Arg
50 55 60

Leu Arg Leu Ile Asp Thr Val Gln Arg Leu Gly Val Ala Tyr His Phe
65 70 75 80

Glu Lys Glu Ile Asp Asp Ala Leu Glu Lys Ile Gly His Asp Pro Phe
85 90 95

Asp Asp Lys Asp Asp Leu Tyr Ile Val Ser Leu Cys Phe Arg Leu Leu
100 105 110

Arg Gln His Gly Ile Lys Ile Ser Cys Asp Val Phe Glu Lys Phe Lys
115 120 125

Asp Asp Asp Gly Lys Phe Lys Ala Ser Leu Met Asn Asp Val Gln Gly
130 135 140

Met Leu Ser Leu Tyr Glu Ala Ala His Leu Ala Ile His Gly Glu Asp
145 150 155 160

Ile Leu Asp Glu Ala Ile Val Phe Thr Thr Thr His Leu Lys Ser Thr
165 170 175

Val Ser Asn Ser Pro Val Asn Ser Thr Phe Ala Glu Gln Ile Arg His
180 185 190

Ser Leu Arg Val Pro Leu Arg Lys Ala Val Pro Arg Leu Glu Ser Arg
195 200 205

Tyr Phe Leu Asp Ile Tyr Ser Arg Asp Asp Leu His Asp Lys Thr Leu
210 215 220

Leu Asn Phe Ala Lys Leu Asp Phe Asn Ile Leu Gln Ala Met His Gln
225 230 235 240

Lys Glu Ala Ser Glu Met Thr Arg Trp Trp Arg Asp Phe Asp Phe Leu
245 250 255

Lys Lys Leu Pro Tyr Ile Arg Asp Arg Val Val Glu Leu Tyr Phe Trp
260 265 270

Ile Leu Val Gly Val Ser Tyr Gln Pro Lys Phe Ser Thr Gly Arg Ile
275 280 285

Phe Leu Ser Lys Ile Ile Cys Leu Glu Thr Leu Val Asp Asp Thr Phe
290 295 300

Asp Ala Tyr Gly Thr Phe Asp Glu Leu Thr Ile Phe Thr Glu Ala Val
305 310 315 320

Thr Arg Trp Asp Ile Gly His Arg Asp Ala Leu Pro Glu Tyr Met Lys
325 330 335

Phe Ile Phe Lys Thr Leu Ile Asp Val Tyr Ser Glu Ala Glu Gln Glu
340 345 350

Leu Ala Lys Glu Gly Arg Ser Tyr Ser Ile Gln Tyr Ala Ile Arg Ser
355 360 365

Phe Gln Glu Leu Val Met Lys Tyr Phe Cys Glu Ala Lys Trp Leu Asn
370 375 380

Lys Gly Tyr Val Pro Ser Leu Asp Asp Tyr Lys Ser Val Ser Leu Arg
385 390 395 400

Ser Ile Gly Phe Leu Pro Ile Ala Val Ala Ser Phe Val Phe Met Gly
405 410 415

Asp Ile Ala Thr Lys Glu Val Phe Glu Trp Glu Met Asn Asn Pro Lys
420 425 430

Ile Ile Ile Ala Ala Glu Thr Ile Phe Arg Phe Leu Asp Asp Ile Ala
435 440 445

Gly His Lys Phe Glu Gln Lys Arg Glu His Ser Pro Ser Ala Ile Glu
450 455 460

Cys Tyr Lys Asn Gln His Gly Val Ser Glu Glu Glu Ala Val Lys Ala
465 470 475 480

Leu Ser Leu Glu Val Ala Asn Ser Trp Lys Asp Ile Asn Glu Glu Leu
485 490 495

Leu Leu Asn Pro Met Ala Ile Pro Leu Pro Leu Leu Gln Val Ile Leu
500 505 510

Asp Leu Ser Arg Ser Ala Asp Phe Met Tyr Gly Asn Ala Gln Asp Arg
515 520 525

Phe Thr His Ser Thr Met Met Lys Asp Gln Val Asp Leu Val Leu Lys
530 535 540

Asp Pro Val Lys Leu Asp Asp
545 550