

PhoenixTemp5924.tmp.txt  
SEQUENCE LISTING

<110> BASF Plant Science GmbH  
Wiig, Aaron

<120> POLYNUCLEOTIDES ENCODING TRUNCATED SUCROSE ISOMERASE POLYPEPTIDES  
FOR CONTROL OF PARASITIC NEMATODES

<130> PF 58853

<160> 27

<170> PatentIn version 3.4

<210> 1

<211> 1464

<212> DNA

<213> Erwinia rhapontici

<400> 1

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<210> 2  
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 <212> PRT  
 <213> Erwinia rhapontici

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 35 40 45

Asn Pro Tyr Arg Asp Tyr Tyr Phe Trp Arg Asp Gly Lys Asp Gly His  
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Asp Asp Lys Ser Gly Gln Tyr Tyr Leu His Tyr Phe Ala Lys Gln Gln  
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Pro Asp Leu Asn Trp Asp Asn Pro Lys Val Arg Gln Asp Leu Tyr Asp  
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Met Leu Arg Phe Trp Leu Asp Lys Gly Val Ser Gly Leu Arg Phe Asp  
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Gln Gln Leu Lys Asn Phe Ala Glu Glu Tyr Thr Lys Gly Pro Lys Ile  
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His Asp Tyr Val Asn Glu Met Asn Arg Glu Val Leu Ser His Tyr Asp  
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305 310 315 320

Gln Asp Tyr Val Glu Thr Gly Lys Val Lys Ala Glu Glu Phe Leu Gln  
325 330 335

Asn Val Arg Gln Thr Ser Arg Asp Asn Ser Arg Thr Pro Phe Gln Trp  
340 345 350

Asp Ala Ser Lys Asn Ala Gly Phe Thr Ser Gly Thr Pro Trp Leu Lys  
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Ile Asn Pro Asn Tyr Lys Glu Ile Asn Ser Ala Asp Gln Ile Asn Asn  
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Asp Ile Pro Ala Leu Thr Tyr Gly Ser Tyr Ile Asp Leu Asp Pro Asp  
405 410 415

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<211> 1803  
<212> DNA  
<213> Erwinia rhapontici

## PhoenixTemp5924.tmp.txt

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<210> 4  
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<212> DNA  
<213> Serratia sp.

PhoenixTemp5924.tmp.txt

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<210> 5
<211> 487
<212> PRT
<213> Serratia sp.

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Thr Ser Asp Gln Asn Glu Trp Phe Val Lys Ser Lys Ser Ser Lys Asp
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PhoenixTemp5924.tmp.txt

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 Asp Glu Lys Thr Asn Gln Tyr Tyr Leu His Tyr Phe Ala Lys Gln Gln  
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 Pro Asp Leu Asn Trp Asp Asn Pro Lys Val Arg Gln Asp Leu Tyr Ala  
 100 105 110  
 Met Leu Arg Phe Trp Leu Asp Lys Gly Val Ser Gly Leu Arg Phe Asp  
 115 120 125  
 Thr Val Ala Thr Tyr Ser Lys Ile Pro Asp Phe Pro Asn Leu Thr Gln  
 130 135 140  
 Gln Gln Leu Lys Asn Phe Ala Ala Glu Tyr Thr Lys Gly Pro Asn Ile  
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 His Arg Tyr Val Asn Glu Met Asn Arg Glu Val Leu Ser His Tyr Asp  
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 Ile Ala Thr Ala Gly Glu Ile Phe Gly Val Pro Leu Asp Gln Ser Ile  
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 Lys Phe Phe Asp Arg Arg Arg Asp Glu Leu Asn Ile Ala Phe Thr Phe  
 195 200 205  
 Asp Leu Ile Arg Leu Asp Arg Asp Ser Asp Gln Arg Trp Arg Arg Lys  
 210 215 220  
 Glu Trp Lys Leu Ser Gln Phe Arg Gln Val Ile Asp Asn Val Asp Arg  
 225 230 235 240  
 Thr Ala Gly Glu Tyr Gly Trp Asn Ala Phe Phe Leu Asp Asn His Asp  
 245 250 255  
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 260 265 270  
 Glu Pro Ser Ala Lys Ala Leu Ala Thr Leu Thr Leu Thr Gln Arg Ala  
 275 280 285  
 Thr Pro Phe Ile Tyr Gln Gly Ser Glu Leu Gly Met Thr Asn Tyr Pro  
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 Phe Lys Ala Ile Asp Glu Phe Asp Asp Ile Glu Val Lys Gly Phe Trp  
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PhoenixTemp5924.tmp.txt

His Asp Tyr Val Glu Thr Gly Lys Val Lys Ala Asp Glu Phe Leu Gln  
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Asn Val Arg Leu Thr Ser Arg Asp Asn Ser Arg Thr Pro Phe Gln Trp  
340 345 350

Asp Thr Ser Lys Asn Ala Gly Phe Thr Ser Gly Lys Pro Trp Phe Lys  
355 360 365

Val Asn Pro Asn Tyr Gln Glu Ile Asn Ala Val Ser Gln Val Ala Gln  
370 375 380

Pro Asp Ser Val Phe Asn Tyr Tyr Arg Gln Leu Ile Lys Ile Arg His  
385 390 395 400

Asn Ile Pro Ala Leu Thr Tyr Gly Thr Tyr Thr Asp Leu Asp Pro Ala  
405 410 415

Asn Asp Ser Val Tyr Ala Tyr Thr Arg Ser Leu Gly Ala Glu Lys Tyr  
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Leu Val Val Val Asn Phe Gln Glu Gln Val Met Arg Tyr Lys Leu Pro  
435 440 445

Asp Asn Leu Ser Ile Glu Lys Val Ile Ile Glu Ser Asn Ser Lys Asn  
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Val Val Lys Lys Asn Asp Ser Leu Leu Glu Leu Lys Pro Trp Gln Ser  
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Gly Val Tyr Lys Leu Asn Gln  
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<212> DNA  
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PhoenixTemp5924.tmp.txt

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PhoenixTemp5924.tmp.txt

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gttccaagag	acgttataat	cgtatgcaat	catatgcttg	cgtagatttt	ccaacagttt	180
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atcttagatt	ttatttttcc	tttttagttt	tgaaaattaa	aaatttaaat	ttattagata	960
tatatgttac	tttttcagtt	ttcctattta	tttaagaaaa	aaatattttt	taacacatgt	1020
caacttgtaa	acaatagact	gaacacgtca	ttttatatta	tgtttagttt	tgaaaattaa	1080
agttaattaa	atattttatat	ttcttttttt	tagcttttct	aattattttt	aaaatagtaa	1140
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PhoenixTemp5924.tmp.txt

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gttgtcgaat ttgaatttga attttgagtt aaatactaca catttgttga caacttatta	1680
aactttacaa gtctgctaca aatattgtca aatattttact aattaatgga ccaaaatcct	1740
ctaacttgca aatttgatc tacatcaact taaaaattag gaatatgcga cccaaaaaaaa	1800
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agaggaagtt tataaattga ccacacattt agtctattat catcacatgt attaagactt	1920
gacaacttgt ctttctcaca ccaaaccct ctcctctgtt tcataacatc tgctctttct	1980
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 <211> 1967  
 <212> DNA  
 <213> Arabidopsis thaliana

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ttaataaact agtggtaggt aggaatagtt aaaatgtaag tatcaaagtt ttttgaattt	180
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aaatgaaaat gtattttcgg gttctcagtt tgttttgtga aatatcaata cacaatgtta	360
aaaaagaatc ggcttctttc agcttatgat attcattaat tttccacaca ccatttttca	420
aagggaata gcaaaaaaaaa taaaattaa aacagccagc taaattaatc agtgaaatca	480
tccaaactgt ttacaaaga cattttttcg gccaaatcaa ataaaaaaaaat cgattgttat	540
tgacagtctt tgtgatctta ttggttacgt tatacccacc tgtgcactcc acttttaagt	600
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cggcaaatgt taataaacta tttgaaaaag aaagagtcatt gtgtcccgtc aattcaagta	960
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PhoenixTemp5924.tmp.txt

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tatattaata	ccacattgac	gagaacattc	tcattagtga	tcgtagatta	ataatctagc	1560
catcttaata	agcaaaatat	ataatccaaa	aaatgcgaca	ttattttaca	tacgcaagtg	1620
ttcacaacca	atagtccaat	atataaatta	attaagtagg	tatgtaatat	aaccaaggaa	1680
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gatacgtgct	tgacaacaat	taaaaaccta	tattttttaa	agtgatgctt	aaatagccaa	1800
tggattgaaa	tgtgcactcg	catatatgtc	tttttgtgtc	agcacaattt	ggctatatata	1860
gcaagtactc	tcttgtagta	atcattcaca	gtcataacta	attaagtaca	tttgaataca	1920
tcaaatacca	agaagagaaa	atttagagag	aaagagaaa	agataaa		1967

<210> 11  
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 <212> DNA  
 <213> Arabidopsis thaliana

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atgcattaat	ttttttttat	actagatcat	agtattatat	ctcttaattct	acctattgaa	180
atctacttaa	tgttttttact	aaaacctacg	tgtttctctt	tagagaattt	tgtgctatgc	240
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ttatacatta	tgaaaatgca	aagggcagat	acgaataaat	tagaaacttg	tttaacgggt	480
cagagttagc	ttctagtctc	tttcgacttg	gatacttctt	cttctacaat	tgggacatta	540
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tattttttgga	ataatcatat	gagtgatcga	agtttgtatt	tatatattca	atcttcacaa	660
actactttta	tttaaaaatc	atttgcaaaa	tgctatttta	ttgacaaaaa	gatatatgct	720
ataaaaataaa	ataaaaattca	caaactatag	tcattaatac	aaaaagaaat	cattgaatat	780
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aggagcctct	aattagtaat	attcttatgg	gtccactgtg	gcttagagga	cttgattaaa	960
accattctta	tttagtgcta	actttgtgag	ggttggaata	acgaaccaag	ctgattcaaa	1020
ccattccaaa	acaaagtgtg	cacatatttc	aaaaccaaag	tttaccggac	agagaaatat	1080
gggtgtgtttt	tctcaaacca	agctaaatgg	aatccattgt	aaacaaaaat	gttcacacct	1140
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PhoenixTemp5924.tmp.txt

ctgattgcct tgcacatcat tcttggatca actttttttt tttttttttt tggggtaatt 1260  
aacaaaatgc ttaaatttct caagactata ggatcacatt acctgtgtgc ttaacataac 1320  
ttttagatag gctagagaat tgatctatta caagataatc aataatttac agaagaaaac 1380  
attctttttt ttgttctatt tccttcatgt aggtatgtag ctgtatatta tactatcttg 1440  
tattttcgat atcgtgctgg aactgtcaca gatgca 1476

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<211> 38  
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<220>  
<223> primer sequence

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ggcgcgcac catgaaagaa tacggtacga tggaagac 38

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<220>  
<223> primer sequence

<400> 13  
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<210> 14  
<211> 485  
<212> PRT  
<213> Klebsiella sp. LX3

<400> 14

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20 25 30

Thr Ser Asp Gln His Pro Trp Phe Ile Gln Ser Lys Ser Asp Lys Asn  
35 40 45

Asn Pro Tyr Arg Asp Tyr Tyr Phe Trp Arg Asp Gly Lys Asp Asn Gln  
50 55 60

Pro Pro Asn Asn Tyr Pro Ser Phe Phe Gly Gly Ser Ala Trp Gln Lys  
65 70 75 80

Asp Ala Lys Ser Gly Gln Tyr Tyr Leu His Tyr Phe Ala Arg Gln Gln  
85 90 95

Pro Asp Leu Asn Trp Asp Asn Pro Lys Val Arg Glu Asp Leu Tyr Ala  
100 105 110

PhoenixTemp5924.tmp.txt

Met Leu Arg Phe Trp Leu Asp Lys Gly Val Ser Gly Met Arg Phe Asp  
115 120 125

Thr Val Ala Thr Tyr Ser Lys Ile Pro Gly Phe Pro Asn Leu Thr Pro  
130 135 140

Glu Gln Gln Lys Asn Phe Ala Glu Gln Tyr Thr Met Gly Pro Asn Ile  
145 150 155 160

His Arg Tyr Ile Gln Glu Met Asn Arg Lys Val Leu Ser Arg Tyr Asp  
165 170 175

Val Ala Thr Ala Gly Glu Ile Phe Gly Val Pro Leu Asp Arg Ser Ser  
180 185 190

Gln Phe Phe Asp Arg Arg Arg His Glu Leu Asn Met Ala Phe Met Phe  
195 200 205

Asp Leu Ile Arg Leu Asp Arg Asp Ser Asn Glu Arg Trp Arg His Lys  
210 215 220

Ser Trp Ser Leu Ser Gln Phe Arg Gln Ile Ile Ser Lys Met Asp Val  
225 230 235 240

Thr Val Gly Lys Tyr Gly Trp Asn Thr Phe Phe Leu Asp Asn His Asp  
245 250 255

Asn Pro Arg Ala Val Ser His Phe Gly Asp Asp Arg Pro Gln Trp Arg  
260 265 270

Glu Ala Ser Ala Lys Ala Leu Ala Thr Ile Thr Leu Thr Gln Arg Ala  
275 280 285

Thr Pro Phe Ile Tyr Gln Gly Ser Glu Leu Gly Met Thr Asn Tyr Pro  
290 295 300

Phe Arg Gln Leu Asn Glu Phe Asp Asp Ile Glu Val Lys Gly Phe Trp  
305 310 315 320

Gln Asp Tyr Val Gln Ser Gly Lys Val Thr Ala Thr Glu Phe Leu Asp  
325 330 335

Asn Val Arg Leu Thr Ser Arg Asp Asn Ser Arg Thr Pro Phe Gln Trp  
340 345 350

Asn Asp Thr Leu Asn Ala Gly Phe Thr Arg Gly Lys Pro Trp Phe His  
355 360 365

Ile Asn Pro Asn Tyr Val Glu Ile Asn Ala Glu Arg Glu Glu Thr Arg  
370 375 380

PhoenixTemp5924.tmp.txt

Glu Asp Ser Val Leu Asn Tyr Tyr Lys Lys Met Ile Gln Leu Arg His  
385 390 395 400

His Ile Pro Ala Leu Val Tyr Gly Ala Tyr Gln Asp Leu Asn Pro Gln  
405 410 415

Asp Asn Thr Val Tyr Ala Tyr Thr Arg Thr Leu Gly Asn Glu Arg Tyr  
420 425 430

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

Ala Asn Asp Ala Ile Glu Glu Val Val Ile Asp Thr Gln Gln Gln Ala  
450 455 460

Ala Ala Pro His Ser Thr Ser Leu Ser Leu Ser Pro Trp Gln Ala Gly  
465 470 475 480

Val Tyr Lys Leu Arg  
485

<210> 15  
<211> 485  
<212> PRT  
<213> Raoultella planticola  
<400> 15

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Met Lys Lys Arg Asn Met Arg Leu Met Ile Asp Val Val Ile Asn His  
20 25 30

Thr Ser Asp Gln His Pro Trp Phe Ile Gln Ser Lys Ser Asp Lys Asn  
35 40 45

Asn Pro Tyr Arg Asp Tyr Tyr Phe Trp Arg Asp Gly Lys Asp Asn Gln  
50 55 60

Pro Pro Asn Asn Tyr Pro Ser Phe Phe Gly Gly Ser Ala Trp Gln Lys  
65 70 75 80

Asp Ala Lys Ser Gly Gln Tyr Tyr Leu His Tyr Phe Ala Arg Gln Gln  
85 90 95

Pro Asp Leu Asn Trp Asp Asn Pro Lys Val Arg Glu Asp Leu Tyr Ala  
100 105 110

Met Leu Arg Phe Trp Leu Asp Lys Gly Val Ser Ser Met Arg Phe Asp  
115 120 125

Thr Val Ala Thr Tyr Ser Lys Ile Pro Gly Phe Pro Asn Leu Thr Pro  
130 135 140

PhoenixTemp5924.tmp.txt

Glu Gln Gln Lys Asn Phe Ala Glu Gln Tyr Thr Met Gly Pro Asn Ile  
 145 150 155 160  
 His Arg Tyr Ile Gln Glu Met Asn Arg Lys Val Leu Ser Arg Tyr Asp  
 165 170 175  
 Val Ala Thr Ala Gly Glu Ile Phe Gly Val Pro Leu Asp Arg Ser Ser  
 180 185 190  
 Gln Phe Phe Asp Pro Arg Arg His Glu Leu Asn Met Ala Phe Met Phe  
 195 200 205  
 Asp Leu Ile Arg Leu Asp Arg Asp Ser Asn Glu Arg Trp Arg His Lys  
 210 215 220  
 Ser Trp Ser Leu Ser Gln Phe Arg Gln Ile Ile Ser Lys Met Asp Val  
 225 230 235 240  
 Thr Val Gly Lys Tyr Gly Trp Asn Thr Phe Phe Leu Asp Asn His Asp  
 245 250 255  
 Asn Pro Arg Ala Val Ser His Phe Gly Asp Asp Arg Pro Gln Trp Arg  
 260 265 270  
 Glu Ala Ser Ala Lys Ala Leu Ala Thr Ile Thr Leu Thr Gln Arg Ala  
 275 280 285  
 Thr Pro Phe Ile Tyr Gln Gly Ser Glu Leu Gly Met Thr Asn Tyr Pro  
 290 295 300  
 Phe Arg Gln Leu Asn Glu Phe Asp Asp Ile Glu Val Lys Gly Phe Trp  
 305 310 315 320  
 Gln Asp Tyr Val Gln Ser Gly Lys Val Thr Ala Thr Glu Phe Leu Asp  
 325 330 335  
 Asn Val Arg Leu Thr Ser Arg Asp Asn Ser Arg Thr Pro Phe Gln Trp  
 340 345 350  
 Asn Asp Thr Leu Asn Ala Gly Phe Thr Arg Gly Lys Pro Trp Phe His  
 355 360 365  
 Ile Asn Pro Asn Tyr Val Glu Ile Asn Ala Glu Arg Glu Glu Thr Arg  
 370 375 380  
 Glu Asp Ser Val Leu Asn Tyr Tyr Lys Lys Met Ile Gln Leu Arg His  
 385 390 395 400  
 His Ile Pro Ala Leu Val Tyr Gly Ala Tyr Gln Asp Leu Asn Pro Gln  
 405 410 415



PhoenixTemp5924.tmp.txt

Asp Asn Thr Val Tyr Ala Tyr Thr Arg Thr Leu Gly Asn Glu Arg Tyr  
420 425 430

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

Ala Asn Asp Ala Ile Glu Glu Val Val Ile Asp Thr Gln Gln Gln Ala  
450 455 460

Thr Ala Pro His Ser Thr Ser Leu Ser Leu Ser Pro Trp Gln Ala Gly  
465 470 475 480

Val Tyr Lys Leu Arg  
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<210> 16  
<211> 486  
<212> PRT  
<213> Pantoea dispersa

<400> 16

Met Lys Glu Tyr Gly Ser Met Ala Asp Phe Asp Arg Leu Val Ala Glu  
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Met Asn Lys Arg Gly Met Arg Leu Met Ile Asp Ile Val Ile Asn His  
20 25 30

Thr Ser Asp Arg His Arg Trp Phe Val Gln Ser Arg Ser Gly Lys Asp  
35 40 45

Asn Pro Tyr Arg Asp Tyr Tyr Phe Trp Arg Asp Gly Lys Gln Gly Gln  
50 55 60

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

Asp Lys Gln Thr Asp Gln Tyr Tyr Leu His Tyr Phe Ala Pro Gln Gln  
85 90 95

Pro Asp Leu Asn Trp Asp Asn Pro Lys Val Arg Ala Glu Leu Tyr Asp  
100 105 110

Ile Leu Arg Phe Trp Leu Asp Lys Gly Val Ser Gly Leu Arg Phe Asp  
115 120 125

Thr Val Ala Thr Phe Ser Lys Ile Pro Gly Phe Pro Asp Leu Ser Lys  
130 135 140

Ala Gln Leu Lys Asn Phe Ala Glu Ala Tyr Thr Glu Gly Pro Asn Ile  
145 150 155 160

His Lys Tyr Ile His Glu Met Asn Arg Gln Val Leu Ser Lys Tyr Asn

## PhoenixTemp5924.tmp.txt

165

170

175

Val Ala Thr Ala Gly Glu Ile Phe Gly Val Pro Val Ser Ala Met Pro  
180 185 190

Asp Tyr Phe Asp Arg Arg Arg Glu Glu Leu Asn Ile Ala Phe Thr Phe  
195 200 205

Asp Leu Ile Arg Leu Asp Arg Tyr Pro Asp Gln Arg Trp Arg Arg Lys  
210 215 220

Pro Trp Thr Leu Ser Gln Phe Arg Gln Val Ile Ser Gln Thr Asp Arg  
225 230 235 240

Ala Ala Gly Glu Phe Gly Trp Asn Ala Phe Phe Leu Asp Asn His Asp  
245 250 255

Asn Pro Arg Gln Val Ser His Phe Gly Asp Asp Ser Pro Gln Trp Arg  
260 265 270

Glu Arg Ser Ala Lys Ala Leu Ala Thr Leu Leu Leu Thr Gln Arg Ala  
275 280 285

Thr Pro Phe Ile Phe Gln Gly Ala Glu Leu Gly Met Thr Asn Tyr Pro  
290 295 300

Phe Lys Asn Ile Glu Glu Phe Asp Asp Ile Glu Val Lys Gly Phe Trp  
305 310 315 320

Asn Asp Tyr Val Ala Ser Gly Lys Val Asn Ala Ala Glu Phe Leu Gln  
325 330 335

Glu Val Arg Met Thr Ser Arg Asp Asn Ser Arg Thr Pro Met Gln Trp  
340 345 350

Asn Asp Ser Val Asn Ala Gly Phe Thr Gln Gly Lys Pro Trp Phe His  
355 360 365

Leu Asn Pro Asn Tyr Lys Gln Ile Asn Ala Ala Arg Glu Val Asn Lys  
370 375 380

Pro Asp Ser Val Phe Ser Tyr Tyr Arg Gln Leu Ile Asn Leu Arg His  
385 390 395 400

Gln Ile Pro Ala Leu Thr Ser Gly Glu Tyr Arg Asp Leu Asp Pro Gln  
405 410 415

Asn Asn Gln Val Tyr Ala Tyr Thr Arg Ile Leu Asp Asn Glu Lys Tyr  
420 425 430

Leu Val Val Val Asn Phe Lys Pro Glu Gln Leu His Tyr Ala Leu Pro  
435 440 445

PhoenixTemp5924.tmp.txt

Asp Asn Leu Thr Ile Ala Ser Ser Leu Leu Glu Asn Val His Gln Pro  
450 455 460

Ser Leu Gln Glu Asn Ala Ser Thr Leu Thr Leu Ala Pro Trp Gln Ala  
465 470 475 480

Gly Ile Tyr Lys Leu Asn  
485

<210> 17  
<211> 485  
<212> PRT  
<213> Pseudomonas mesoacidophila  
<400> 17

Met Lys Glu Tyr Gly Thr Met Glu Asp Phe Asp Arg Leu Met Ala Glu  
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Leu Lys Lys Arg Gly Met Arg Leu Met Val Asp Val Val Ile Asn His  
20 25 30

Ser Ser Asp Gln His Glu Trp Phe Lys Ser Ser Arg Ala Ser Lys Asp  
35 40 45

Asn Pro Tyr Arg Asp Tyr Tyr Phe Trp Arg Asp Gly Lys Asp Gly His  
50 55 60

Glu Pro Asn Asn Tyr Pro Ser Phe Phe Gly Gly Ser Ala Trp Glu Lys  
65 70 75 80

Asp Pro Val Thr Gly Gln Tyr Tyr Leu His Tyr Phe Gly Arg Gln Gln  
85 90 95

Pro Asp Leu Asn Trp Asp Thr Pro Lys Leu Arg Glu Glu Leu Tyr Ala  
100 105 110

Met Leu Arg Phe Trp Leu Asp Lys Gly Val Ser Gly Met Arg Phe Asp  
115 120 125

Thr Val Ala Thr Tyr Ser Lys Thr Pro Gly Phe Pro Asp Leu Thr Pro  
130 135 140

Glu Gln Met Lys Asn Phe Ala Glu Ala Tyr Thr Gln Gly Pro Asn Leu  
145 150 155 160

His Arg Tyr Leu Gln Glu Met His Glu Lys Val Phe Asp His Tyr Asp  
165 170 175

Ala Val Thr Ala Gly Glu Ile Phe Gly Ala Pro Leu Asn Gln Val Pro  
180 185 190

## PhoenixTemp5924.tmp.txt

Leu Phe Ile Asp Ser Arg Arg Lys Glu Leu Asp Met Ala Phe Thr Phe  
195 200 205

Asp Leu Ile Arg Tyr Asp Arg Ala Leu Asp Arg Trp His Thr Ile Pro  
210 215 220

Arg Thr Leu Ala Asp Phe Arg Gln Thr Ile Asp Lys Val Asp Ala Ile  
225 230 235 240

Ala Gly Glu Tyr Gly Trp Asn Thr Phe Phe Leu Gly Asn His Asp Asn  
245 250 255

Pro Arg Ala Val Ser His Phe Gly Asp Asp Arg Pro Gln Trp Arg Glu  
260 265 270

Ala Ser Ala Lys Ala Leu Ala Thr Val Thr Leu Thr Gln Arg Gly Thr  
275 280 285

Pro Phe Ile Phe Gln Gly Asp Glu Leu Gly Met Thr Asn Tyr Pro Phe  
290 295 300

Lys Thr Leu Gln Asp Phe Asp Asp Ile Glu Val Lys Gly Phe Phe Gln  
305 310 315 320

Asp Tyr Val Glu Thr Gly Lys Ala Thr Ala Glu Glu Leu Leu Thr Asn  
325 330 335

Val Ala Leu Thr Ser Arg Asp Asn Ala Arg Thr Pro Phe Gln Trp Asp  
340 345 350

Asp Ser Ala Asn Ala Gly Phe Thr Thr Gly Lys Pro Trp Leu Lys Val  
355 360 365

Asn Pro Asn Tyr Thr Glu Ile Asn Ala Ala Arg Glu Ile Gly Asp Pro  
370 375 380

Lys Ser Val Tyr Ser Phe Tyr Arg Asn Leu Ile Ser Ile Arg His Glu  
385 390 395 400

Thr Pro Ala Leu Ser Thr Gly Ser Tyr Arg Asp Ile Asp Pro Ser Asn  
405 410 415

Ala Asp Val Tyr Ala Tyr Thr Arg Ser Gln Asp Gly Glu Thr Tyr Leu  
420 425 430

Val Val Val Asn Phe Lys Ala Glu Pro Arg Ser Phe Thr Leu Pro Asp  
435 440 445

Gly Met His Ile Ala Glu Thr Leu Ile Glu Ser Ser Ser Pro Ala Ala  
450 455 460

Pro Ala Ala Gly Ala Ala Ser Leu Glu Leu Gln Pro Trp Gln Ser Gly  
Page 20

465

470

475

480

Ile Tyr Lys Val Lys  
485

&lt;210&gt; 18

&lt;211&gt; 486

&lt;212&gt; PRT

&lt;213&gt; Erwinia carotovora

&lt;400&gt; 18

Met Lys Glu Tyr Gly Thr Met Asp Asp Phe Asp Arg Leu Ile Ala Glu  
1 5 10 15

Met Lys Lys Arg Asp Met Arg Leu Met Ile Asp Val Val Val Asn His  
20 25 30

Thr Ser Asp Glu His Glu Trp Phe Val Glu Ser Lys Lys Ser Lys Asp  
35 40 45

Asn Pro Tyr Arg Asp Tyr Tyr Ile Trp Arg Asp Gly Lys Asp Gly Thr  
50 55 60

Gln Pro Asn Asn Tyr Pro Ser Phe Phe Gly Gly Ser Ala Trp Gln Lys  
65 70 75 80

Asp Asn Ala Thr Gln Gln Tyr Tyr Leu His Tyr Phe Gly Val Gln Gln  
85 90 95

Pro Asp Leu Asn Trp Asp Asn Pro Lys Val Arg Glu Glu Val Tyr Asp  
100 105 110

Met Leu Arg Phe Trp Ile Asp Lys Gly Val Ser Gly Leu Arg Met Asp  
115 120 125

Thr Val Ala Thr Phe Ser Lys Asn Pro Ala Phe Pro Asp Leu Thr Pro  
130 135 140

Lys Gln Leu Gln Asn Phe Ala Tyr Thr Tyr Thr Gln Gly Pro Asn Leu  
145 150 155 160

His Arg Tyr Ile Gln Glu Met His Gln Lys Val Leu Ala Lys Tyr Asp  
165 170 175

Val Val Ser Ala Gly Glu Ile Phe Gly Val Pro Leu Glu Glu Ala Ala  
180 185 190

Pro Phe Ile Asp Gln Arg Arg Lys Glu Leu Asp Met Ala Phe Ser Phe  
195 200 205

Asp Leu Ile Arg Leu Asp Arg Ala Val Glu Glu Arg Trp Arg Arg Asn  
210 215 220

PhoenixTemp5924.tmp.txt

Asp Trp Thr Leu Ser Gln Phe Arg Gln Ile Asn Asn Arg Leu Val Asp  
 225 230 235 240  
 Met Ala Gly Gln His Gly Trp Asn Thr Phe Phe Leu Ser Asn His Asp  
 245 250 255  
 Asn Pro Arg Ala Val Ser His Phe Gly Asp Asp Arg Pro Glu Trp Arg  
 260 265 270  
 Thr Arg Ser Ala Lys Ala Leu Ala Thr Leu Ala Leu Thr Gln Arg Ala  
 275 280 285  
 Thr Pro Phe Ile Tyr Gln Gly Asp Glu Leu Gly Met Thr Asn Tyr Pro  
 290 295 300  
 Phe Thr Ser Leu Ser Glu Phe Asp Asp Ile Glu Val Lys Gly Phe Trp  
 305 310 315 320  
 Gln Asp Phe Val Glu Thr Gly Lys Val Lys Pro Asp Val Phe Leu Glu  
 325 330 335  
 Asn Val Lys Gln Thr Ser Arg Asp Asn Ser Arg Thr Pro Phe Gln Trp  
 340 345 350  
 Ser Asn Thr Ala Gln Ala Gly Phe Thr Thr Gly Thr Pro Trp Phe Arg  
 355 360 365  
 Ile Asn Pro Asn Tyr Lys Asn Ile Asn Ala Glu Glu Gln Thr Gln Asn  
 370 375 380  
 Pro Asp Ser Ile Phe His Phe Tyr Arg Gln Leu Ile Glu Leu Arg His  
 385 390 395 400  
 Ala Thr Pro Ala Phe Thr Tyr Gly Thr Tyr Gln Asp Leu Asp Pro Asn  
 405 410 415  
 Asn Asn Glu Val Leu Ala Tyr Thr Arg Glu Leu Asn Gln Gln Arg Tyr  
 420 425 430  
 Leu Val Val Val Asn Phe Lys Glu Lys Pro Val His Tyr Val Leu Pro  
 435 440 445  
 Lys Thr Leu Ser Ile Lys Gln Ser Leu Leu Glu Ser Gly Gln Lys Asp  
 450 455 460  
 Lys Val Glu Pro Asn Ala Thr Thr Leu Glu Leu Gln Pro Trp Gln Ser  
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 Gly Ile Tyr Gln Leu Asn  
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<210> 19

<211> 483

<212> PRT

<213> Azotobacter vinelandii

<400> 19

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Ser Ser Asp Glu His Arg Trp Phe Val Glu Ser Arg Arg Ser Lys Asp  
35 40 45

Asn Pro Tyr Arg Asp Tyr Tyr Thr Trp Arg Asp Gly Lys Asp Gly Ala  
50 55 60

Ala Pro Asn Asn Tyr Pro Ser Phe Phe Gly Gly Ser Ala Trp Lys Lys  
65 70 75 80

Asp Glu Ala Thr Gly Gln Tyr Tyr Leu His Tyr Phe Ala Gly Lys Gln  
85 90 95

Pro Asp Leu Asn Trp Glu Asn Pro Glu Val Arg Ala Glu Val His Asp  
100 105 110

Ile Met Arg Phe Trp Leu Asp Lys Gly Val Ser Gly Phe Arg Met Asp  
115 120 125

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

Gln Ala Leu Ala His Pro Glu Phe Val Tyr Ala Asn Gly Pro Arg Ile  
145 150 155 160

His Glu Tyr Leu Gln Glu Met Asn Arg Glu Val Leu Ser Arg Tyr Asp  
165 170 175

Thr Met Thr Val Gly Glu Ala Phe Gly Ile Thr Phe Glu Gln Ala Pro  
180 185 190

Leu Phe Thr Asp Ala Arg Arg His Glu Leu Asn Met Ile Phe His Phe  
195 200 205

Asp Leu Val Arg Leu Asp Arg Asp Gly Trp Arg Lys Lys Asp Trp Thr  
210 215 220

Leu Pro Glu Leu Lys Ala Thr Tyr Ala Arg Ile Asp Arg Thr Gly Gly  
225 230 235 240

Asp His Gly Trp Asn Thr Ser Phe Leu Gly Asn His Asp Asn Pro Arg  
245 250 255

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Ala Val Ser His Phe Gly Asp Asp Ser Pro Glu Trp Arg Ala Ala Ser  
260 265 270

Ala Lys Ala Leu Ala Thr Met Met Leu Thr Gln Arg Ala Thr Pro Phe  
275 280 285

Leu Tyr Gln Gly Asp Glu Leu Gly Met Thr Asn Tyr Pro Phe Arg Gly  
290 295 300

Leu Glu Asp Tyr Asp Asp Val Glu Val Lys Gly Gln Trp Arg Asp Phe  
305 310 315 320

Val Glu Ser Gly Lys Val Ser Ala Asp Glu Tyr Leu Ala His Leu Arg  
325 330 335

Gln Thr Ser Arg Asp Asn Ala Arg Thr Pro Met Gln Trp Ser Asp Ala  
340 345 350

Pro Asn Gly Gly Phe Thr Thr Gly Lys Pro Trp Leu Ala Val Asn Pro  
355 360 365

Asn Tyr Pro Gln Val Asn Ala Ala Ser Gln Val Asp Asp Pro Gly Ser  
370 375 380

Ile Tyr His His Tyr Arg Arg Leu Leu Glu Val Arg Arg Gln Thr Pro  
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Ala Leu Ile His Gly Gln Phe Arg Asp Leu Asp Pro Ala Asn Pro Lys  
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Val Phe Ala Tyr Thr Arg Thr Leu Asp Asp Lys Arg Tyr Leu Val Leu  
420 425 430

Ile Asn Phe Thr Arg Glu Thr Val Ala Tyr Asp Leu Pro Glu Gly Leu  
435 440 445

Lys Ile Ala Ala Thr Leu Leu Asp Asn Gly Ala Ala Gln Glu Ser Met  
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Tyr Arg Leu

<210> 20  
<211> 475  
<212> PRT  
<213> Caulobacter sp. K31  
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## PhoenixTemp5924.tmp.txt

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Met Thr Ala Arg Gly Met Arg Leu Ile Ile Asp Leu Val Val Asn His  
20 25 30

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35 40 45

Asn Pro Tyr Arg Asp Tyr Tyr Ile Trp Arg Asp Gly Lys Asp Gly Gly  
50 55 60

Pro Pro Asn Asn Tyr Ser Ala Phe Phe Gly Gly Pro Ala Trp Thr Phe  
65 70 75 80

Asp Ala Val Thr Asp Gln Tyr Tyr Leu His Tyr Phe Ala Ala Lys Gln  
85 90 95

Pro Asp Leu Asn Trp Glu Asn Pro Lys Val Arg Ala Glu Val His Asp  
100 105 110

Leu Met Arg Phe Trp Leu Asp Lys Gly Val Ser Gly Phe Arg Met Asp  
115 120 125

Val Ile Pro Phe Ile Ser Lys Pro Pro Gly Leu Pro Asp Leu Thr Pro  
130 135 140

Gln Glu Arg Arg Ala Pro Gln Phe Val Tyr Ala Ala Asp Pro Lys Leu  
145 150 155 160

His Asp Tyr Leu Arg Glu Met Arg Arg Glu Val Leu Asp His Tyr Asp  
165 170 175

Thr Met Thr Val Gly Glu Ala Phe Gly Val Thr Pro Asp Ala Ala Arg  
180 185 190

Asp Leu Ile Asp Ser Arg Arg Gly Glu Leu Asp Leu Val Phe Asn Phe  
195 200 205

Asp Ile Val Arg Met Asp Ile Asp Gly Trp Arg Lys Thr Ser Trp Thr  
210 215 220

Leu Pro Arg Leu Lys Ala Leu Tyr Thr Gln Leu Asp Gln Ala Ala Gly  
225 230 235 240

Pro Phe Gly Trp Asn Thr Gln Phe Leu Ser Asn His Asp Asn Pro Arg  
245 250 255

Ser Val Ser His Phe Gly Asp Asp Asp Pro Ala Trp Val Glu Arg Ser  
260 265 270

Ala Lys Val Leu Ala Thr Leu Ile Leu Thr Gln Arg Gly Thr Pro Phe  
Page 25

PhoenixTemp5924.tmp.txt  
275 280 285

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290 295 300  
Leu Asp Asp Phe Asp Asp Leu Glu Val Ala Gly Arg Trp Arg Asp Val  
305 310 315 320  
Lys His Arg Val Ser Glu Glu Glu Tyr Leu Ala Asn Ala Arg Ala Met  
325 330 335  
Gly Arg Asp Asn Ser Arg Thr Pro Met Gln Trp Thr Gly Asp Pro His  
340 345 350  
Gly Gly Phe Thr Thr Gly Lys Pro Trp Leu Ala Val Asn Pro Asn Ala  
355 360 365  
Ala Thr Ile Asn Ala Gln Asp Gln Ala Ala Arg Pro Asp Ser Val Leu  
370 375 380  
Thr His Cys Arg Ala Leu Ile Ala Trp Arg Arg Gly Ser Val Asp Leu  
385 390 395 400  
Arg Glu Gly Asp Tyr Arg Asp Ile Asp Pro Asp His Pro Gln Val Phe  
405 410 415  
Ala Tyr Arg Arg Gly Glu Gly Leu Leu Val Leu Leu Asn Phe Gly Arg  
420 425 430  
Glu Thr Val Arg Tyr Ala Leu Pro Glu Gly Leu Ala Ile Glu Ser Ala  
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gatgcaaagt caggacagta ctatttacac tattttgcc aacagcaacc tgatctcaac 300  
tgggataacc cgaaagtacg tgaggatctt tacgcaatgc tccgcttctg gctggataaa 360

## PhoenixTemp5924.tmp.txt

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```

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<212> DNA
<213> Raoultella planticola

```

```

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gagctgaata tggcgtdtat gtttgacctc attcgtctcg atcgcgacag caatgaacgc 660
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## PhoenixTemp5924.tmp.txt

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gtgtataagc tgcggtaa	1458

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 <213> Pantoea dispersa

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## PhoenixTemp5924.tmp.txt

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&lt;211&gt; 1458

&lt;212&gt; DNA

&lt;213&gt; Pseudomonas mesoacidophila

&lt;400&gt; 24

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1458

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 <212> DNA  
 <213> *Erwinia carotovora*

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 <213> *Azotobacter vinelandii*

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taccggctct ga	1452

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&lt;211&gt; 1428

&lt;212&gt; DNA

&lt;213&gt; Caulobacter sp. K31

&lt;400&gt; 27

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PhoenixTemp5924.tmp.txt

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