

SEQUENCE LISTING

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<130> 11363.204-WO

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<170> PatentIn version 3.5

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<211> 1695

<212> DNA

<213> Paenibacillus polymyxa

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<213>  Paenibacillus polymyxa

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Ser  Val  Ala  Phe  Ser  Ser  Ser  Ile  Ala  Ser  Ala  Val  Val  His  Gly  Gln
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Thr  Ala  Lys  Thr  Ile  Thr  Ile  Lys  Val  Asp  Thr  Phe  Lys  Asp  Arg  Lys
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Pro  Ile  Ser  Pro  Tyr  Ile  Tyr  Gly  Thr  Asn  Gln  Asp  Leu  Ala  Gly  Asp
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Glu  Asn  Met  Ala  Ala  Arg  Arg  Leu  Gly  Gly  Asn  Arg  Met  Thr  Gly  Tyr
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Asn  Trp  Glu  Asn  Asn  Met  Ser  Asn  Ala  Gly  Ser  Asp  Trp  Gln  Gln  Ser
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Ser  Asp  Asn  Tyr  Leu  Cys  Ser  Asn  Gly  Gly  Leu  Thr  Gln  Ala  Glu  Cys
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Glu  Lys  Pro  Gly  Ala  Val  Thr  Thr  Ser  Phe  His  Asp  Gln  Ser  Leu  Lys
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Leu  Gly  Thr  Tyr  Ser  Leu  Val  Thr  Leu  Pro  Met  Ala  Gly  Tyr  Val  Ala
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Lys  Asp  Gly  Asn  Gly  Ser  Val  Gln  Glu  Ser  Glu  Lys  Ala  Pro  Ser  Ala
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Arg Trp Asn Gln Val Val Asn Ala Lys Asn Ala Pro Phe Gln Leu Gln
165 170 175

Pro Asp Leu Asn Asp Asn Arg Val Tyr Val Asp Glu Phe Val His Phe
180 185 190

Leu Val Asn Lys Tyr Gly Thr Ala Ser Thr Lys Ala Gly Val Lys Gly
195 200 205

Tyr Ala Leu Asp Asn Glu Pro Ala Leu Trp Ser His Thr His Pro Arg
210 215 220

Ile His Gly Glu Lys Val Gly Ala Lys Glu Leu Val Asp Arg Ser Val
225 230 235 240

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

Gly Pro Val Leu Tyr Gly Phe Gly Ala Tyr Lys Asp Leu Gln Thr Ala
260 265 270

Pro Asp Trp Asp Ser Val Lys Gly Asn Tyr Ser Trp Phe Val Asp Tyr
275 280 285

Tyr Leu Asp Gln Met Arg Leu Ser Ser Gln Val Glu Gly Lys Arg Leu
290 295 300

Leu Asp Val Phe Asp Val His Trp Tyr Pro Glu Ala Met Gly Gly Gly
305 310 315 320

Ile Arg Ile Thr Asn Glu Val Gly Asn Asp Glu Thr Lys Lys Ala Arg
325 330 335

Met Gln Ala Pro Arg Thr Leu Trp Asp Pro Thr Tyr Lys Glu Asp Ser
340 345 350

Trp Ile Ala Gln Trp Asn Ser Glu Phe Leu Pro Ile Leu Pro Arg Leu
355 360 365

Lys Gln Ser Val Asp Lys Tyr Tyr Pro Gly Thr Lys Leu Ala Met Thr
370 375 380

Glu Tyr Ser Tyr Gly Gly Glu Asn Asp Ile Ser Gly Gly Ile Ala Met
385 390 395 400

Thr Asp Val Leu Gly Ile Leu Gly Lys Asn Asp Val Tyr Met Ala Asn
405 410 415

Tyr Trp Lys Leu Lys Asp Gly Val Asn Asn Tyr Val Ser Ala Ala Tyr
420 425 430

Lys Leu Tyr Arg Asn Tyr Asp Gly Lys Asn Ser Thr Phe Gly Asp Thr
435 440 445

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

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

Lys Ser Met Asp Ser Ala Phe Asp Ala Gln Phe Asp Leu Ser Gly Ala
485 490 495

Lys Thr Tyr Ile Ser Gly Lys Val Trp Gly Phe Asp Lys Asn Ser Ser
500 505 510

Gln Ile Lys Glu Ala Ala Pro Ile Thr Gln Ile Ser Gly Asn Arg Phe
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Thr Tyr Thr Val Pro Pro Leu Thr Ala Tyr His Ile Val Leu Thr Thr
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<211> 524
<212> PRT
<213> Paenibacillus polymyxa

<400> 3

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

Arg Met Thr Gly Tyr Asn Trp Glu Asn Asn Met Ser Asn Ala Gly Ser

50

55

60

Asp Trp Gln Gln Ser Ser Asp Asn Tyr Leu Cys Ser Asn Gly Gly Leu
65 70 75 80

Thr Gln Ala Glu Cys Glu Lys Pro Gly Ala Val Thr Thr Ser Phe His
85 90 95

Asp Gln Ser Leu Lys Leu Gly Thr Tyr Ser Leu Val Thr Leu Pro Met
100 105 110

Ala Gly Tyr Val Ala Lys Asp Gly Asn Gly Ser Val Gln Glu Ser Glu
115 120 125

Lys Ala Pro Ser Ala Arg Trp Asn Gln Val Val Asn Ala Lys Asn Ala
130 135 140

Pro Phe Gln Leu Gln Pro Asp Leu Asn Asp Asn Arg Val Tyr Val Asp
145 150 155 160

Glu Phe Val His Phe Leu Val Asn Lys Tyr Gly Thr Ala Ser Thr Lys
165 170 175

Ala Gly Val Lys Gly Tyr Ala Leu Asp Asn Glu Pro Ala Leu Trp Ser
180 185 190

His Thr His Pro Arg Ile His Gly Glu Lys Val Gly Ala Lys Glu Leu
195 200 205

Val Asp Arg Ser Val Ser Leu Ser Lys Ala Val Lys Ala Ile Asp Ala
210 215 220

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

Asp Leu Gln Thr Ala Pro Asp Trp Asp Ser Val Lys Gly Asn Tyr Ser
245 250 255

Trp Phe Val Asp Tyr Tyr Leu Asp Gln Met Arg Leu Ser Ser Gln Val
260 265 270

Glu Gly Lys Arg Leu Leu Asp Val Phe Asp Val His Trp Tyr Pro Glu
275 280 285

Ala Met Gly Gly Gly Ile Arg Ile Thr Asn Glu Val Gly Asn Asp Glu
290 295 300

Thr Lys Lys Ala Arg Met Gln Ala Pro Arg Thr Leu Trp Asp Pro Thr
305 310 315 320

Tyr Lys Glu Asp Ser Trp Ile Ala Gln Trp Asn Ser Glu Phe Leu Pro
325 330 335

Ile Leu Pro Arg Leu Lys Gln Ser Val Asp Lys Tyr Tyr Pro Gly Thr
340 345 350

Lys Leu Ala Met Thr Glu Tyr Ser Tyr Gly Gly Glu Asn Asp Ile Ser
355 360 365

Gly Gly Ile Ala Met Thr Asp Val Leu Gly Ile Leu Gly Lys Asn Asp
370 375 380

Val Tyr Met Ala Asn Tyr Trp Lys Leu Lys Asp Gly Val Asn Asn Tyr
385 390 395 400

Val Ser Ala Ala Tyr Lys Leu Tyr Arg Asn Tyr Asp Gly Lys Asn Ser
405 410 415

Thr Phe Gly Asp Thr Ser Val Ser Ala Gln Thr Ser Asp Ile Val Asn
420 425 430

Ser Ser Val His Ala Ser Val Thr Asn Ala Ser Asp Lys Glu Leu His
435 440 445

Leu Val Val Met Asn Lys Ser Met Asp Ser Ala Phe Asp Ala Gln Phe
450 455 460

Asp Leu Ser Gly Ala Lys Thr Tyr Ile Ser Gly Lys Val Trp Gly Phe
465 470 475 480

Asp Lys Asn Ser Ser Gln Ile Lys Glu Ala Ala Pro Ile Thr Gln Ile
485 490 495

Ser Gly Asn Arg Phe Thr Tyr Thr Val Pro Pro Leu Thr Ala Tyr His
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Ile Val Leu Thr Thr Gly Asn Asp Thr Ser Pro Val
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<212> DNA

<213> Paenibacillus polymyxa

<400> 4

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actgccagac gacttggtgg caatcgaatg accggatata actgggaaaa caatatgtcc	180
aatgcaggaa gcgactggat gcagtccagc gatagctatt tatgcgacaa cgccggattg	240
acaaaagccg aatgtgaaaa gccagggtgcg gtggcaacct cgtttcacga tcaatcgctg	300
aagcagggca catattcttt agtcacactg ccgatggccg gttatgtggc caaggatgga	360
aacggaagtg tgcaggaaag cgaaaaggct ctttcgctc ggtggaatga ggtcgtaaac	420
gctaaaaatg cgccgtttca attgcagcct gatctgaaag acaatcaggt ttatgcggat	480
gaattcgta actttttagt gaaaaagtac ggcgttgctt caacaaaaac gggcgtgaaa	540
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<211> 530

<212> PRT

<213> Paenibacillus polymyxa

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Glu Leu Ala Gly Asp Glu Asn Leu Thr Ala Arg Arg Leu Gly Gly Asn
35 40 45

Arg Met Thr Gly Tyr Asn Trp Glu Asn Asn Met Ser Asn Ala Gly Ser
50 55 60

Asp Trp Met Gln Ser Ser Asp Ser Tyr Leu Cys Asp Asn Ala Gly Leu
65 70 75 80

Thr Lys Ala Glu Cys Glu Lys Pro Gly Ala Val Ala Thr Ser Phe His
85 90 95

Asp Gln Ser Leu Lys Gln Gly Thr Tyr Ser Leu Val Thr Leu Pro Met
100 105 110

Ala Gly Tyr Val Ala Lys Asp Gly Asn Gly Ser Val Gln Glu Ser Glu
115 120 125

Lys Ala Pro Ser Ala Arg Trp Asn Glu Val Val Asn Ala Lys Asn Ala
130 135 140

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

Glu Phe Val Asn Phe Leu Val Lys Lys Tyr Gly Val Ala Ser Thr Lys
165 170 175

Thr Gly Val Lys Gly Tyr Ser Leu Asp Asn Glu Pro Ala Leu Trp Ser
180 185 190

His Thr His Pro Arg Ile His Gly Glu Lys Val Gly Ala Lys Glu Leu
195 200 205

Val Asp Arg Ser Val Ser Leu Ser Lys Ala Ala Lys Ala Val Asp Ala
210 215 220

Gly Ala Glu Ile Phe Gly Pro Val Leu Tyr Gly Phe Gly Ala Tyr Lys

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Glu	Gly	Lys	Arg	Leu	Leu	Asp	Val	Phe	Asp	Val	His	Trp	Tyr	Pro	Glu
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Thr	Lys	Lys	Ala	Arg	Met	Gln	Ala	Pro	Arg	Thr	Leu	Trp	Asp	Pro	Thr
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Tyr	Lys	Glu	Asp	Ser	Trp	Ile	Ala	Gln	Trp	Asn	Ser	Glu	Phe	Leu	Pro
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Thr	Phe	Gly	Asp	Ile	Ser	Val	His	Ala	Gln	Thr	Ser	Asp	Ile	Val	Asn
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Ser	Ser	Val	His	Ala	Ser	Val	Thr	Asp	Ala	Ser	Tyr	Lys	Glu	Leu	His
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Leu	Val	Val	Met	Asn	Lys	Ser	Met	Asp	Ser	Ala	Phe	Asp	Ala	Gln	Phe
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Asp	Leu	Ser	Gly	Glu	Thr	Thr	Tyr	Gly	Ser	Gly	Lys	Val	Trp	Gly	Phe
465					470					475					480

Asp Lys Asn Ser Ser Gln Ile Lys Glu Ala Ala Pro Ile Thr Gln Ile
485 490 495

Ser Gly Asn Arg Phe Thr Tyr Thr Val Pro Pro Leu Thr Ala Tyr His
500 505 510

Ile Val Leu Thr Ala Gly Asn Asp Thr Pro Val Glu Asn Pro Glu Ser
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Phe Ala
530

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<212> DNA
<213> Paenibacillus polymyxa

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gccaaaaatg cgccgttcca actacagcct gatctgaatg acaatcaggt atatgcggat 480
gaattcgtca attttttagt gaaaaagtac ggcgctgctt caacaaaggc ggggtgtgaaa 540
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 <211> 524
 <212> PRT
 <213> Paenibacillus polymyxa

<400> 7

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Asp Leu Ala Gly Asp Glu Asn Leu Ala Ala Arg Arg Leu Gly Gly Asn
 35 40 45

Arg Met Thr Gly Tyr Asn Trp Glu Asn Asn Met Ser Asn Ala Gly Ser
 50 55 60

Asp Trp Gln Gln Ser Ser Asp Asn Phe Leu Cys Asn Asn Gly Gly Leu
 65 70 75 80

Thr Lys Ala Glu Cys Glu Lys Pro Gly Ala Val Thr Thr Ser Phe His
 85 90 95

Asp Gln Ser Leu Lys Leu Gly Ala Tyr Ser Leu Val Thr Leu Pro Met
 100 105 110

Ala Gly Tyr Val Ala Lys Asp Gly Asn Gly Ser Val Gln Glu Ser Glu
 115 120 125

Gln Ala Pro Ser Ala Arg Trp Asn Gln Val Val Asn Ala Lys Asn Ala
 130 135 140

Pro Phe Gln Leu Gln Pro Asp Leu Asn Asp Asn Gln Val Tyr Ala Asp
145 150 155 160

Glu Phe Val Asn Phe Leu Val Lys Lys Tyr Gly Ala Ala Ser Thr Lys
165 170 175

Ala Gly Val Lys Gly Tyr Ala Leu Asp Asn Glu Pro Ala Leu Trp Ser
180 185 190

His Thr His Pro Arg Ile His Gly Glu Lys Val Gly Ala Lys Glu Leu
195 200 205

Val Asp Arg Ser Val Ser Leu Ser Lys Ala Val Lys Ala Val Asp Ala
210 215 220

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

Asp Leu Gln Thr Ala Pro Asp Trp Asn Ser Val Lys Gly Asn Tyr Ser
245 250 255

Trp Phe Val Asp Tyr Tyr Leu Asp Gln Met Arg Leu Asn Ser Gln Ala
260 265 270

Glu Gly Lys Arg Leu Leu Asp Val Phe Asp Val His Trp Tyr Pro Glu
275 280 285

Ala Met Gly Gly Gly Ile Arg Ile Thr Asn Glu Val Gly Asn Asp Glu
290 295 300

Thr Lys Lys Ala Arg Met Gln Ala Pro Arg Thr Leu Trp Asp Pro Thr
305 310 315 320

Tyr Lys Glu Asp Ser Trp Ile Ala Gln Trp Asn Ser Ala Phe Leu Pro
325 330 335

Leu Leu Pro Arg Leu Lys Gln Ser Val Asp Lys Tyr Tyr Pro Gly Thr
340 345 350

Lys Leu Ala Leu Thr Glu Tyr Ser Tyr Gly Gly Glu Asn Asp Ile Ser
355 360 365

Gly Gly Ile Ala Met Thr Asp Val Leu Gly Ile Leu Gly Lys Asn Asp
370 375 380

Val Tyr Met Ala Asn Tyr Trp Lys Leu Lys Asp Gly Ala Asn Asn Tyr

385		390		395		400									
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Thr	Phe	Gly	Asp	Ile	Ser	Val	Asn	Ala	Gln	Thr	Ser	Asp	Ile	Val	Asn
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Ser	Ser	Val	His	Ala	Ser	Val	Thr	Asp	Ala	Ser	Tyr	Lys	Glu	Leu	His
		435					440					445			
Leu	Ile	Val	Met	Asn	Lys	Ser	Met	Asp	Ser	Ala	Phe	Asp	Ala	Gln	Phe
	450					455					460				
Asp	Leu	Ser	Gly	Glu	Thr	Thr	Tyr	Ser	Ser	Gly	Lys	Ile	Trp	Gly	Phe
465					470					475					480
Asp	Lys	Asn	Ser	Ser	Gln	Ile	Lys	Ala	Val	Ala	Pro	Ile	Thr	Gln	Ile
				485					490					495	
Ser	Gly	Asn	Arg	Phe	Thr	Tyr	Thr	Val	Pro	Pro	Leu	Thr	Ala	Tyr	His
			500					505					510		
Ile	Val	Leu	Thr	Ala	Asp	Asn	Asp	Thr	Pro	Val	Pro				
		515					520								