

LISTA DE SECUENCIAS

<110> Bonumose LLC

<120> COMPOSICIONES ENZIMÁTICAS INMOVILIZADAS PARA LA PRODUCCIÓN DE HEXOSAS

<130> 146.0015-W000

<150> 62/875321

<151> 2019-07-17

<150> 62/924323

<151> 2019-10-22

<160> 8

<170> PatentIn version 3.5

<210> 1

<211> 808

<212> PRT

<213> Thermus sp. CCB_US3_UF1

<400> 1

Met	Pro	Leu	Leu	Pro	Glu	Pro	Leu	Ser	Gly	Leu	Lys	Glu	Leu	Ala	Tyr
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Asn	Leu	Trp	Trp	Ser	Trp	Asn	Pro	Glu	Ala	Ala	Glu	Leu	Phe	Gln	Glu
		20					25						30		

Ile	Asp	Pro	Ser	Leu	Trp	Lys	Arg	Phe	Arg	Gly	Asn	Pro	Val	Lys	Leu
	35					40					45				

Leu	Leu	Glu	Ala	Asp	Pro	Gly	Arg	Leu	Glu	Gly	Leu	Ala	Ala	Thr	Ser
	50					55					60				

Tyr	Pro	Ala	Arg	Val	Gly	Ala	Val	Val	Glu	Ala	Leu	Arg	Ala	Tyr	Leu
65					70				75						80

Arg	Glu	Arg	Glu	Glu	Lys	Gln	Gly	Pro	Leu	Val	Ala	Tyr	Phe	Ser	Ala
			85					90						95	

Glu	Tyr	Gly	Phe	His	Ser	Ser	Leu	Pro	Ile	Tyr	Ser	Gly	Gly	Leu	Gly
			100					105					110		

Val Leu Ala Gly Asp His Val Lys Ala Ala Ser Asp Leu Gly Leu Asn
115 120 125

Leu Val Gly Val Gly Ile Phe Tyr His Glu Gly Tyr Phe His Gln Arg
130 135 140

Leu Ser Pro Glu Gly Val Gln Val Glu Val Tyr Glu Thr Leu His Pro
145 150 155 160

Glu Glu Leu Pro Leu Tyr Pro Val Gln Asp Arg Glu Gly Arg Pro Leu
165 170 175

Arg Val Gly Val Glu Phe Pro Gly Arg Thr Leu Trp Leu Ser Ala Tyr
180 185 190

Arg Val Gln Val Gly Ala Val Pro Val Tyr Leu Leu Thr Ala Asn Leu
195 200 205

Pro Glu Asn Thr Pro Glu Asp Arg Ala Ile Thr Ala Arg Leu Tyr Ala
210 215 220

Pro Gly Leu Glu Met Arg Ile Gln Gln Glu Leu Val Leu Gly Leu Gly
225 230 235 240

Gly Val Arg Leu Leu Arg Ala Leu Gly Leu Ala Pro Glu Val Phe His
245 250 255

Met Asn Glu Gly His Ser Ala Phe Leu Gly Leu Glu Arg Val Arg Glu
260 265 270

Leu Val Ala Glu Gly His Pro Phe Pro Val Ala Leu Glu Leu Ala Arg
275 280 285

Ala Gly Ala Leu Phe Thr Thr His Thr Pro Val Pro Ala Gly His Asp
290 295 300

Ala Phe Pro Leu Glu Leu Val Glu Arg Tyr Leu Gly Gly Phe Trp Glu
305 310 315 320

Arg Met Gly Thr Asp Arg Glu Thr Phe Leu Ser Leu Gly Leu Glu Glu
325 330 335

Lys Pro Trp Gly Lys Val Phe Ser Met Ser Asn Leu Ala Leu Arg Thr
340 345 350

Ser Ala Gln Ala Asn Gly Val Ser Arg Leu His Gly Glu Val Ser Arg
355 360 365

Glu Met Phe His His Leu Trp Pro Gly Phe Leu Arg Glu Glu Val Pro
370 375 380

Ile Gly His Val Thr Asn Gly Val His Thr Trp Thr Phe Leu His Pro
385 390 395 400

Arg Leu Arg Arg His Tyr Ala Glu Val Phe Gly Pro Glu Trp Arg Lys
405 410 415

Arg Pro Glu Asp Pro Glu Thr Trp Lys Val Glu Ala Leu Gly Glu Glu
420 425 430

Phe Trp Gln Ile His Lys Asp Leu Arg Ala Glu Leu Val Arg Glu Val
435 440 445

Arg Thr Arg Leu Tyr Glu Gln Arg Arg Arg Asn Gly Glu Ser Pro Ser
450 455 460

Arg Leu Arg Glu Ala Glu Lys Val Leu Asp Pro Glu Ala Leu Thr Ile
465 470 475 480

Gly Phe Ala Arg Arg Phe Ala Thr Tyr Lys Arg Ala Val Leu Leu Phe
485 490 495

Lys Asp Pro Glu Arg Leu Arg Arg Leu Leu His Gly His Tyr Pro Ile
500 505 510

Gln Phe Val Phe Ala Gly Lys Ala His Pro Lys Asp Glu Pro Gly Lys
515 520 525

Ala Tyr Leu Gln Glu Leu Phe Ala Lys Ile Arg Glu Tyr Gly Leu Glu
530 535 540

Asp Arg Met Val Val Leu Glu Asp Tyr Asp Met Tyr Leu Ala Arg Val
545 550 555 560

Leu Val His Gly Ser Asp Val Trp Leu Asn Thr Pro Arg Arg Pro Met
565 570 575

Glu Ala Ser Gly Thr Ser Gly Met Lys Ala Ala Leu Asn Gly Ala Leu
580 585 590

Asn Leu Ser Val Leu Asp Gly Trp Trp Ala Glu Ala Tyr Asn Gly Lys
595 600 605

Asn Gly Phe Ala Ile Gly Asp Glu Arg Val Tyr Glu Ser Glu Glu Ala
610 615 620

Gln Asp Met Ala Asp Ala Gln Ala Leu Tyr Asp Val Leu Glu Phe Glu
625 630 635 640

Val Leu Pro Leu Phe Tyr Ala Lys Gly Pro Glu Gly Tyr Ser Ser Gly
645 650 655

Trp Leu Ser Met Val His Glu Ser Leu Arg Thr Val Gly Pro Arg Tyr
660 665 670

Ser Ala Ala Arg Met Val Gly Asp Leu Glu Ile Tyr Arg Arg Gly Gly
675 680 685

Ala Trp Ala Glu Ala Ala Arg Ala Gly Gln Glu Ala Leu Ala Ala Phe
690 695 700

His Gln Ala Leu Pro Ala Leu Gln Gly Val Thr Leu Arg Ala Gln Val
705 710 715 720

Pro Gly Asp Leu Thr Leu Asn Gly Val Pro Met Arg Val Arg Ala Phe
725 730 735

Leu Glu Gly Glu Val Pro Glu Ala Leu Arg Pro Phe Leu Glu Val Gln
740 745 750

Leu Val Val Arg Arg Ser Ser Gly His Leu Glu Val Val Pro Met Arg
755 760 765

Pro Gly Pro Asp Gly Tyr Glu Val Ala Tyr Arg Pro Ser Arg Pro Gly
770 775 780

Ser Tyr Ala Tyr Gly Val Arg Leu Ala Leu Arg His Pro Ile Thr Gly
785 790 795 800

His Val Ala Trp Val Arg Trp Ala
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<210> 2
<211> 473
<212> PRT
<213> *Thermanaerothrix daxensis*

<400> 2

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

Ala His Tyr Leu Lys Thr Lys Gly Tyr Lys Asp Glu Trp Val Val Val
35 40 45

Gly Tyr Asp Lys Arg Phe His Ser Glu Asn Phe Ala Gln Ala Ala Ala
50 55 60

Glu Val Leu Cys Gly Asn Gly Phe Arg Val Tyr Leu Thr Asp Lys Ala
65 70 75 80

Thr Pro Thr Pro Val Ile Ala Tyr Ala Val Val Glu Arg Lys Ala Ile
85 90 95

Gly Ala Val Asn Ile Thr Ala Ser His Asn Pro Pro Thr Asp Asn Gly
100 105 110

Phe Lys Val Arg Asp Ala Ser Gly Gly Ala Ile Asp Pro Glu Gly Leu
115 120 125

Lys Arg Ile Glu Ser Ala Ile Pro Asp Glu Met Ser Ala Val Lys Arg

130		135		140											
Met	Pro	Ala	Ser	Glu	Ala	Glu	Ala	Gln	Gly	Arg	Leu	Val	Arg	Phe	Asp
145					150					155					160
Pro	Ala	Pro	Ala	Tyr	Ile	Glu	His	Leu	Lys	Ser	Leu	Ile	Asp	Leu	Gln
				165					170					175	
Pro	Ile	Arg	Asp	Ala	Gly	Leu	Lys	Ile	Val	Val	Asp	Ala	Met	Trp	Gly
			180					185					190		
Asn	Gly	Ala	Gly	Trp	Phe	Pro	Arg	Leu	Leu	Ala	Gly	Gly	Lys	Thr	Glu
		195					200					205			
Val	Tyr	Glu	Ile	His	Asn	Thr	Arg	Asn	Pro	Ile	Phe	Pro	Glu	Met	Lys
	210					215					220				
Arg	Pro	Glu	Pro	Ile	Pro	Pro	Asn	Ile	Asp	Val	Gly	Leu	Arg	Thr	Thr
225					230					235					240
Val	Glu	Arg	Arg	Ala	Asp	Val	Leu	Val	Val	Thr	Asp	Gly	Asp	Ala	Asp
				245					250					255	
Arg	Val	Gly	Ile	Gly	Asp	Glu	His	Gly	Arg	Phe	Val	Asn	Gln	Leu	Gln
			260					265					270		
Val	Tyr	Gly	Leu	Leu	Ala	Phe	Tyr	Leu	Leu	Glu	Val	Arg	Gly	Glu	Arg
		275					280					285			
Gly	Pro	Ile	Ile	Lys	Thr	Leu	Ser	Thr	Thr	Ser	Met	Leu	Glu	Lys	Leu
	290					295					300				
Gly	Glu	Ile	Tyr	Gly	Val	Pro	Val	Tyr	Glu	Thr	Gly	Val	Gly	Phe	Lys
305					310					315					320
Tyr	Val	Ala	Pro	Lys	Phe	Leu	Glu	Thr	Asn	Ala	Leu	Ile	Gly	Gly	Glu
				325					330					335	
Glu	Ser	Gly	Gly	Tyr	Ala	Phe	Arg	Gly	Asn	Val	Pro	Glu	Arg	Asp	Gly
			340					345					350		

Ile Leu Ala Gly Leu Tyr Phe Leu Asp Met Met Val Arg Leu Asn Arg
355 360 365

Lys Pro Ser Gln Leu Leu Glu Leu Leu Phe Ser Lys Val Gly Pro His
370 375 380

Tyr Tyr Asp Arg Val Asp Arg Gln Phe Thr Gly Asp Arg Lys Thr Arg
385 390 395 400

Glu Glu Met Ile Leu Asn Ala Asn Pro His Thr Ile Gly Gly Leu Lys
405 410 415

Val Val Gly Leu Asn Thr Leu Asp Gly Phe Lys Phe Leu Leu Glu Asp
420 425 430

Gly Gly Trp Met Leu Ile Arg Phe Ser Gly Thr Glu Pro Ile Ile Arg
435 440 445

Val Tyr Cys Glu Thr Thr His Pro Asp Arg Val Gln Pro Ile Leu Gln
450 455 460

Asp Gly Leu Arg Ile Ala Gly Leu Ala
465 470

<210> 3
<211> 415
<212> PRT
<213> Thermus thermophilus

<400> 3

Met Leu Arg Leu Asp Thr Arg Phe Leu Pro Gly Phe Pro Glu Ala Leu
1 5 10 15

Ser Arg His Gly Pro Leu Leu Glu Glu Ala Arg Arg Arg Leu Leu Ala
20 25 30

Lys Arg Gly Glu Pro Gly Ser Met Leu Gly Trp Met Asp Leu Pro Glu
35 40 45

Asp Thr Glu Thr Leu Arg Glu Val Arg Arg Tyr Arg Glu Ala Asn Pro
50 55 60

Trp Val Glu Asp Phe Val Leu Ile Gly Ile Gly Gly Ser Ala Leu Gly
65 70 75 80

Pro Lys Ala Leu Glu Ala Ala Phe Asn Glu Ser Gly Val Arg Phe His
85 90 95

Tyr Leu Asp His Val Glu Pro Glu Pro Ile Leu Arg Leu Leu Arg Thr
100 105 110

Leu Asp Pro Arg Lys Thr Leu Val Asn Ala Val Ser Lys Ser Gly Ser
115 120 125

Thr Ala Glu Thr Leu Ala Gly Leu Ala Val Phe Leu Lys Trp Leu Lys
130 135 140

Ala His Leu Gly Glu Asp Trp Arg Arg His Leu Val Val Thr Thr Asp
145 150 155 160

Pro Lys Glu Gly Pro Leu Arg Ala Phe Ala Glu Arg Glu Gly Leu Lys
165 170 175

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

Pro Val Gly Leu Leu Pro Leu Ala Phe Ala Gly Ala Asp Leu Asp Ala
195 200 205

Leu Leu Met Gly Ala Arg Lys Ala Asn Glu Thr Ala Leu Ala Pro Leu
210 215 220

Glu Glu Ser Leu Pro Leu Lys Thr Ala Leu Leu Leu His Leu His Arg
225 230 235 240

His Leu Pro Val His Val Phe Met Val Tyr Ser Glu Arg Leu Ser His
245 250 255

Leu Pro Ser Trp Phe Val Gln Leu His Asp Glu Ser Leu Gly Lys Val
260 265 270

Asp Arg Gln Gly Gln Arg Val Gly Thr Thr Ala Val Pro Ala Leu Gly
275 280 285

Pro Lys Asp Gln His Ala Gln Val Gln Leu Phe Arg Glu Gly Pro Leu
290 295 300

Asp Lys Leu Leu Ala Leu Val Ile Pro Glu Ala Pro Leu Glu Asp Val
305 310 315 320

Glu Ile Pro Glu Val Glu Gly Leu Glu Ala Ala Ser Tyr Leu Phe Gly
325 330 335

Lys Thr Leu Phe Gln Leu Leu Lys Ala Glu Ala Glu Ala Thr Tyr Glu
340 345 350

Ala Leu Ala Glu Ala Gly Gln Arg Val Tyr Ala Leu Phe Leu Pro Glu
355 360 365

Val Ser Pro Tyr Ala Val Gly Trp Leu Met Gln His Leu Met Trp Gln
370 375 380

Thr Ala Phe Leu Gly Glu Leu Trp Glu Val Asn Ala Phe Asp Gln Pro
385 390 395 400

Gly Val Glu Leu Gly Lys Val Leu Thr Arg Lys Arg Leu Ala Gly
405 410 415

<210> 4
<211> 426
<212> PRT
<213> *Thermanaerothrix daxensis*

<400> 4

Met Val Thr Tyr Leu Asp Phe Val Val Leu Ser His Arg Phe Arg Arg
1 5 10 15

Pro Leu Gly Ile Thr Ser Val Cys Ser Ala His Pro Tyr Val Ile Glu
20 25 30

Ala Ala Leu Arg Asn Gly Met Met Thr His Thr Pro Val Leu Ile Glu
35 40 45

Ala Thr Cys Asn Gln Val Asn Gln Tyr Gly Gly Tyr Thr Gly Met Thr
50 55 60

Pro Ala Asp Phe Val Arg Tyr Val Glu Asn Ile Ala Ala Arg Val Gly
65 70 75 80

Ser Pro Arg Glu Asn Leu Leu Leu Gly Gly Asp His Leu Gly Pro Leu
85 90 95

Val Trp Ala His Glu Pro Ala Glu Ser Ala Met Glu Lys Ala Arg Ala
100 105 110

Leu Val Lys Ala Tyr Val Glu Ala Gly Phe Arg Lys Ile His Leu Asp
115 120 125

Cys Ser Met Pro Cys Ala Asp Asp Arg Asp Phe Ser Pro Lys Val Ile
130 135 140

Ala Glu Arg Ala Ala Glu Leu Ala Gln Val Ala Glu Ser Thr Cys Asp
145 150 155 160

Val Met Gly Leu Pro Leu Pro Asn Tyr Val Ile Gly Thr Glu Val Pro
165 170 175

Pro Ala Gly Gly Ala Lys Ala Glu Ala Glu Thr Leu Arg Val Thr Arg
180 185 190

Pro Glu Asp Ala Ala Glu Thr Ile Ala Leu Thr Arg Ala Ala Phe Phe
195 200 205

Lys Arg Gly Leu Glu Ser Ala Trp Glu Arg Val Val Ala Leu Val Val
210 215 220

Gln Pro Gly Val Glu Phe Gly Asp His Gln Ile His Val Tyr Arg Arg
225 230 235 240

Glu Glu Ala Gln Ala Leu Ser Arg Phe Ile Glu Ser Gln Pro Gly Leu
245 250 255

Val Tyr Glu Ala His Ser Thr Asp Tyr Gln Pro Arg Asp Ala Leu Arg

260	265	270
Ala Leu Val Glu Asp His Phe	Ala Ile Leu Lys Val Gly	Pro Ala Leu
275	280	285
Thr Phe Ala Phe Arg Glu Ala Val Phe Ala Leu Ala Ser Ile Glu Asp		
290	295	300
Trp Val Cys Asp Ser Pro Ser Arg Ile Leu Glu Val Leu Glu Thr Thr		
305	310	315
Met Leu Ala Asn Pro Val Tyr Trp Gln Lys Tyr Tyr Leu Gly Asp Glu		
	325	330
Arg Ala Arg Arg Ile Ala Arg Gly Tyr Ser Phe Ser Asp Arg Ile Arg		
	340	345
Tyr Tyr Trp Ser Ala Pro Ala Val Glu Gln Ala Phe Glu Arg Leu Arg		
	355	360
Ala Asn Leu Asn Arg Val Ser Ile Pro Leu Val Leu Leu Ser Gln Tyr		
	370	375
Leu Pro Asp Gln Tyr Arg Lys Val Arg Asp Gly Arg Leu Pro Asn Gln		
385	390	395
Phe Asp Ala Leu Ile Leu Asp Lys Ile Gln Ala Val Leu Glu Asp Tyr		
	405	410
Asn Val Ala Cys Gly Val Arg Ile Gly Glu		
	420	425
<210> 5		
<211> 219		
<212> PRT		
<213> Sphaerobacter thermophilus		
<400> 5		
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		15

Val Glu Ser Glu Glu Tyr Trp Glu Gln Ala Arg Arg Glu Phe Val Ser
20 25 30

Arg Tyr Gly Gly Thr Trp Gly Asp Asp Ala Gln Gln Ala Val Met Gly
35 40 45

Ala Asn Thr Arg Gln Trp Ser Arg Tyr Ile Arg Glu Ala Phe Asp Ile
50 55 60

Pro Leu Thr Glu Glu Glu Ile Ala Ala Ala Val Ile Ala Arg Met Gln
65 70 75 80

Glu Leu Tyr His Asp His Leu Pro Leu Leu Pro Gly Ala Ile Pro Ala
85 90 95

Val Arg Ala Leu Ala Asp Arg Tyr Pro Leu Ala Val Ala Ser Ser Ser
100 105 110

Pro Pro Val Leu Ile Arg Phe Val Leu Ala Glu Met Gly Val Ala Glu
115 120 125

Cys Phe Gln Ser Val Thr Ser Ser Asp Glu Val Ala His Gly Lys Pro
130 135 140

Ala Pro Asp Val Tyr His Leu Ala Cys Glu Arg Leu Gly Val Ala Pro
145 150 155 160

Glu Gln Ala Val Ala Phe Glu Asp Ser Thr Ala Gly Ile Ala Ala Ala
165 170 175

Leu Ala Ala Gly Leu Arg Val Ile Ala Val Pro Asn Arg Ser Tyr Pro
180 185 190

Pro Asp Pro Asp Val Leu Arg Arg Ala Asp Leu Thr Leu Pro Ser Leu
195 200 205

Glu Glu Phe Asp Pro Ala Val Leu Glu Gln Trp
210 215

<210> 6
<211> 511

<212> PRT

<213> Anaerolinea thermophila

<400> 6

Met Ser Leu Phe Lys Arg Ala Ser Gly Ile Leu Leu His Pro Thr Ser
1 5 10 15

Leu Pro Gly Pro Asp Gly Ile Gly Asp Leu Gly Pro Glu Ala Tyr Arg
20 25 30

Trp Val Asn Phe Leu Ala Glu Ser Gly Cys Ser Leu Trp Gln Ile Leu
35 40 45

Pro Leu Gly Pro Thr Gly Phe Gly Asp Ser Pro Tyr Gln Cys Phe Ser
50 55 60

Ala Phe Ala Gly Asn Pro Tyr Leu Val Ser Pro Ala Leu Leu Leu Asp
65 70 75 80

Glu Gly Leu Leu Thr Ser Glu Asp Leu Ala Asp Arg Pro Glu Phe Pro
85 90 95

Ala Ser Arg Val Asp Tyr Gly Pro Val Ile Gln Trp Lys Leu Thr Leu
100 105 110

Leu Asp Arg Ala Tyr Val Arg Phe Lys Arg Ser Thr Ser Gln Lys Arg
115 120 125

Lys Ala Ala Phe Glu Ala Phe Lys Glu Glu Gln Arg Ala Trp Leu Leu
130 135 140

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

Trp Asp Tyr Trp Pro Glu Pro Leu Arg Lys Arg Asp Pro Glu Ala Leu
165 170 175

Asn Ala Phe His Arg Ala His Glu Val Asp Val Glu Arg His Ser Phe
180 185 190

Arg Gln Phe Leu Phe Phe Arg Gln Trp Gln Ala Leu Arg Gln Tyr Ala

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

Val Arg Arg Tyr Leu Ala Arg Ser Gly Glu Asp Ile Ala Trp Asp Met
420 425 430

Ile Arg Ala Val Trp Ser Ser Val Ala Met Phe Ala Ile Ala Pro Leu
435 440 445

Gln Asp Phe Leu Lys Leu Gly Pro Glu Ala Arg Met Asn Tyr Pro Gly
450 455 460

Arg Pro Ala Gly Asn Trp Gly Trp Arg Tyr Glu Ala Phe Met Leu Asp
465 470 475 480

Asp Gly Leu Lys Asn Arg Ile Lys Glu Ile Asn Tyr Leu Tyr Gly Arg
485 490 495

Leu Pro Glu His Met Lys Pro Pro Lys Val Val Lys Lys Trp Thr
500 505 510

<210> 7
<211> 225
<212> PRT
<213> Thermoanaerobacterium thermosaccharolyticum

<400> 7

Met Lys Pro Met Phe Ala Pro Ser Leu Met Cys Ala Asn Phe Leu Asp
1 5 10 15

Leu Lys Asn Gln Ile Glu Ile Leu Asn Glu Arg Ala Asp Ile Tyr His
20 25 30

Ile Asp Ile Met Asp Gly His Tyr Val Lys Asn Phe Ala Leu Ser Pro
35 40 45

Tyr Leu Met Glu Gln Leu Lys Thr Ile Ala Lys Ile Pro Met Asp Ala
50 55 60

His Leu Met Val Glu Asn Pro Ala Asp Phe Leu Glu Cys Ile Ala Lys
65 70 75 80

Ser Gly Ala Thr Tyr Ile Ser Pro His Ala Glu Thr Ile Asn Lys Asp
85 90 95

Ala Phe Arg Ile Met Arg Thr Ile Lys Ala Leu Gly Cys Lys Thr Gly
100 105 110

Ile Val Leu Asn Pro Ala Thr Pro Val Glu Tyr Ile Lys Tyr Tyr Ile
115 120 125

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

Gly Gln Thr Phe Ile Asn Glu Met Leu Asp Lys Ile Ala Glu Ile Lys
145 150 155 160

Ser Leu Arg Asp Gln Asn Gly Tyr Ser Tyr Leu Ile Glu Val Asp Gly
165 170 175

Ser Cys Asn Glu Lys Thr Phe Lys Gln Leu Ala Glu Ala Gly Thr Asp
180 185 190

Val Phe Val Val Gly Ser Ser Gly Leu Phe Asn Leu Asp Thr Asp Leu
195 200 205

Lys Val Ala Trp Asp Lys Met Met Asp Thr Phe Thr Arg Cys Thr Ser
210 215 220

Asn
225

<210> 8
<211> 220
<212> PRT
<213> Methanosarcina thermophila

<400> 8

Met Leu Lys Ala Leu Ile Phe Asp Met Asp Gly Val Leu Val Asp Ser
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Met Pro Phe His Ala Ala Ala Trp Lys Lys Ala Phe Phe Glu Met Gly
20 25 30

Met Glu Ile Gln Asp Ser Asp Ile Phe Ala Ile Glu Gly Ser Asn Pro

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