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Ala Gln Asp Pro Ala Phe Asp Asp Ser Ala Trp Gln Gln Val Asp Leu

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Pro His Asp Tyr Ser Ile Thr Gln Lys Tyr Ser Gln Ser Asn Glu Ala

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Glu Ser Ala Tyr Leu Pro Gly Gly Thr Gly Trp Tyr Arg Lys Ser Phe

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Ala Gln Asp Pro Ala Phe Asp Asp Ser Ala Trp Gln Gln Val Asp Leu

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Pro His Asp Tyr Ser Ile Thr Gln Lys Tyr Ser Gln Ser Asn Glu Ala

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Glu Ser Ala Tyr Leu Pro Gly Gly Thr Gly Trp Tyr Arg Lys Ser Phe

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Thr Ile Asp Arg Asp Leu Ala Gly Lys Arg Ile Ala Ile Asn Phe Asp

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Thr His Pro Tyr Gly Tyr Ser Pro Phe Ser Phe Asp Leu Thr Gly Asn

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Ala Lys Phe Gly Gly Glu Asn Thr Ile Val Val Lys Val Glu Asn Arg

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Thr Glu Lys Arg Leu Ile Gly Glu Lys Ser Phe Thr Lys Lys Thr Thr

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Lys Asp Leu Ser Tyr Ile Glu Val Asp Val Thr Asp Ala Asn Gly His

785 790 795 800

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Lys Asp Glu Thr Trp Ala Lys Phe Asp Leu Thr Ser Thr Ile Asn Arg

420 425 430

Asp Arg Asn Ala Pro Ser Val Ile Met Trp Ser Leu Gly Asn Glu Met

435 440 445

Met Glu Gly Ile Ser Gly Ser Val Ser Gly Phe Pro Ala Thr Ser Ala

450 455 460

Lys Leu Val Ala Trp Thr Lys Ala Ala Asp Ser Thr Arg Pro Met Thr

465 470 475 480

Tyr Gly Asp Asn Lys Ile Lys Ala Asn Trp Asn Glu Ser Asn Thr Met

485 490 495

Gly Asp Asn Leu Thr Ala Asn Gly Gly Val Val Gly Thr Asn Tyr Ser

500 505 510

Asp Gly Ala Asn Tyr Asp Lys Ile Arg Thr Thr His Pro Ser Trp Ala

515 520 525

Ile Tyr Gly Ser Glu Thr Ala Ser Ala Ile Asn Ser Arg Gly Ile Tyr

530 535 540

Asn Arg Thr Thr Gly Gly Ala Gln Ser Ser Asp Lys Gln Leu Thr Ser
545 550 555 560

Tyr Asp Asn Ser Ala Val Gly Trp Gly Ala Val Ala Ser Ser Ala Trp
 565 570 575

Tyr Asp Val Val Gln Arg Asp Phe Val Ala Gly Thr Tyr Val Trp Thr
 580 585 590

Gly Phe Asp Tyr Leu Gly Glu Pro Thr Pro Trp Asn Gly Thr Gly Ser
 595 600 605

Gly Ala Val Gly Ser Trp Pro Ser Pro Lys Asn Ser Tyr Phe Gly Ile
 610 615 620

Val Asp Thr Ala Gly Phe Pro Lys Asp Thr Tyr Tyr Phe Tyr Gln Ser
625 630 635 640

Gln Trp Asn Asp Asp Val His Thr Leu His Ile Leu Pro Ala Trp Asn
 645 650 655

Glu Asn Val Val Ala Lys Gly Ser Gly Asn Asn Val Pro Val Val Val
 660 665 670

Tyr Thr Asp Ala Ala Lys Val Lys Leu Tyr Phe Thr Pro Lys Gly Ser

675 680 685

Thr Glu Lys Arg Leu Ile Gly Glu Lys Ser Phe Thr Lys Lys Thr Thr

690 695 700

Ala Ala Gly Tyr Thr Tyr Gln Val Tyr Glu Gly Ser Asp Lys Asp Ser

705 710 715 720

Thr Ala His Lys Asn Met Tyr Leu Thr Trp Asn Val Pro Trp Ala Glu

725 730 735

Gly Thr Ile Ser Ala Glu Ala Tyr Asp Glu Asn Asn Arg Leu Ile Pro

740 745 750

Glu Gly Ser Thr Glu Gly Asn Ala Ser Val Thr Thr Thr Gly Lys Ala

755 760 765

Ala Lys Leu Lys Ala Asp Ala Asp Arg Lys Thr Ile Thr Ala Asp Gly

770 775 780

Lys Asp Leu Ser Tyr Ile Glu Val Asp Val Thr Asp Ala Asn Gly His

785 790 795 800

Ile Val Pro Asp Ala Ala Asn Arg Val Thr Phe Asp Val Lys Gly Ala

805 810 815

Gly Lys Leu Val Gly Val Asp Asn Gly Ser Ser Pro Asp His Asp Ser
820 825 830

Tyr Gln Ala Asp Asn Arg Lys Ala Phe Ser Gly Lys Val Leu Ala Ile
835 840 845

Val Gln Ser Thr Lys Glu Ala Gly Glu Ile Thr Val Thr Ala Lys Ala
850 855 860

Asp Gly Leu Gln Ser Ser Thr Val Lys Ile Ala Thr Thr Ala Val Pro
865 870 875 880

Gly Thr Ser Thr Glu Lys Thr Val Arg Ser Phe Tyr Tyr Ser Arg Asn
885 890 895

Tyr Tyr Val Lys Thr Gly Asn Lys Pro Ile Leu Pro Ser Asp Val Glu
900 905 910

Val Arg Tyr Ser Asp Gly Thr Ser Asp Arg Gln Asn Val Thr Trp Asp
915 920 925

Ala Val Ser Asp Asp Gln Ile Ala Lys Ala Gly Ser Phe Ser Val Ala
930 935 940

Gly Thr Val Ala Gly Gln Lys Ile Ser Val Arg Val Thr Met Ile Asp

945 950 955 960

Glu Ile Gly Ala Leu Leu Asn Tyr Ser Ala Ser Thr Pro Val Gly Thr

965 970 975

Pro Ala Val Leu Pro Gly Ser Arg Pro Ala Val Leu Pro Asp Gly Thr

980 985 990

Val Thr Ser Ala Asn Phe Ala Val His Trp Thr Lys Pro Ala Asp Thr

995 1000 1005

Val Tyr Asn Thr Ala Gly Thr Val Lys Val Pro Gly Thr Ala Thr

1010 1015 1020

Val Phe Gly Lys Glu Phe Lys Val Thr Ala Thr Ile Arg Val Gln

1025 1030 1035

Arg Ser Gln Val Thr Ile Gly Ser Ser Val Ser Gly Asn Ala Leu

1040 1045 1050

Arg Leu Thr Gln Asn Ile Pro Ala Asp Lys Gln Ser Asp Thr Leu

1055 1060 1065

Asp Ala Ile Lys Asp Gly Ser Thr Thr Val Asp Ala Asn Thr Gly

1070 1075 1080

Gly Gly Ala Asn Pro Ser Ala Trp Thr Asn Trp Ala Tyr Ser Lys
1085 1090 1095

Ala Gly His Asn Thr Ala Glu Ile Thr Phe Glu Tyr Ala Thr Glu
1100 1105 1110

Gln Gln Leu Gly Gln Ile Val Met Tyr Phe Phe Arg Asp Ser Asn
1115 1120 1125

Ala Val Arg Phe Pro Asp Ala Gly Lys Thr Lys Ile Gln Ile Ser
1130 1135 1140

Ala Asp Gly Lys Asn Trp Thr Asp Leu Ala Ala Thr Glu Thr Ile
1145 1150 1155

Ala Ala Gln Glu Ser Ser Asp Arg Val Lys Pro Tyr Thr Tyr Asp
1160 1165 1170

Phe Ala Pro Val Gly Ala Thr Phe Val Lys Val Thr Val Thr Asn
1175 1180 1185

Ala Asp Thr Thr Thr Pro Ser Gly Val Val Cys Ala Gly Leu Thr
1190 1195 1200

Glu Ile Glu Leu Lys Thr Ala Thr
1205 1210

<210> 6

<211> 1296

<212> PRT

<213> Secuencia artificial

<220>

<223> Fragmento de lacasa truncado

<400> 6

Val Glu Asp Ala Thr Arg Ser Asp Ser Thr Thr Gln Met Ser Ser Thr
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Pro Glu Val Val Tyr Ser Ser Ala Val Asp Ser Lys Gln Asn Arg Thr
20 25 30

Ser Asp Phe Asp Ala Asn Trp Lys Phe Met Leu Ser Asp Ser Val Gln
35 40 45

Ala Gln Asp Pro Ala Phe Asp Asp Ser Ala Trp Gln Gln Val Asp Leu
50 55 60

Pro His Asp Tyr Ser Ile Thr Gln Lys Tyr Ser Gln Ser Asn Glu Ala
65 70 75 80

Glu Ser Ala Tyr Leu Pro Gly Gly Thr Gly Trp Tyr Arg Lys Ser Phe

85 90 95

Thr Ile Asp Arg Asp Leu Ala Gly Lys Arg Ile Ala Ile Asn Phe Asp

100 105 110

Gly Val Tyr Met Asn Ala Thr Val Trp Phe Asn Gly Val Lys Leu Gly

115 120 125

Thr His Pro Tyr Gly Tyr Ser Pro Phe Ser Phe Asp Leu Thr Gly Asn

130 135 140

Ala Lys Phe Gly Gly Glu Asn Thr Ile Val Val Lys Val Glu Asn Arg

145 150 155 160

Leu Pro Ser Ser Arg Trp Tyr Ser Gly Ser Gly Ile Tyr Arg Asp Val

165 170 175

Thr Leu Thr Val Thr Asp Gly Val His Val Gly Asn Asn Gly Val Ala

180 185 190

Ile Lys Thr Pro Ser Leu Ala Thr Gln Asn Gly Gly Asp Val Thr Met

195 200 205

Asn Leu Thr Thr Lys Val Ala Asn Asp Thr Glu Ala Ala Ala Asn Ile

210 215 220

Thr Leu Lys Gln Thr Val Phe Pro Lys Gly Gly Lys Thr Asp Ala Ala

225 230 235 240

Ile Gly Thr Val Thr Thr Ala Ser Lys Ser Ile Ala Ala Gly Ala Ser

245 250 255

Ala Asp Val Thr Ser Thr Ile Thr Ala Ala Ser Pro Lys Leu Trp Ser

260 265 270

Ile Lys Asn Pro Asn Leu Tyr Thr Val Arg Thr Glu Val Leu Asn Gly

275 280 285

Gly Lys Val Leu Asp Thr Tyr Asp Thr Glu Tyr Gly Phe Arg Trp Thr

290 295 300

Gly Phe Asp Ala Thr Ser Gly Phe Ser Leu Asn Gly Glu Lys Val Lys

305 310 315 320

Leu Lys Gly Val Ser Met His His Asp Gln Gly Ser Leu Gly Ala Val

325 330 335

Ala Asn Arg Arg Ala Ile Glu Arg Gln Val Glu Ile Leu Gln Lys Met

340 345 350

Gly Val Asn Ser Ile Arg Thr Thr His Asn Pro Ala Ala Lys Ala Leu

355 360 365

Ile Asp Val Cys Asn Glu Lys Gly Val Leu Val Val Glu Glu Val Phe

370 375 380

Asp Met Trp Asn Arg Ser Lys Asn Gly Asn Thr Glu Asp Tyr Gly Lys

385 390 395 400

Trp Phe Gly Gln Ala Ile Ala Gly Asp Asn Ala Val Leu Gly Gly Asp

405 410 415

Lys Asp Glu Thr Trp Ala Lys Phe Asp Leu Thr Ser Thr Ile Asn Arg

420 425 430

Asp Arg Asn Ala Pro Ser Val Ile Met Trp Ser Leu Gly Asn Glu Met

435 440 445

Met Glu Gly Ile Ser Gly Ser Val Ser Gly Phe Pro Ala Thr Ser Ala

450 455 460

Lys Leu Val Ala Trp Thr Lys Ala Ala Asp Ser Thr Arg Pro Met Thr

465 470 475 480

Tyr Gly Asp Asn Lys Ile Lys Ala Asn Trp Asn Glu Ser Asn Thr Met

485 490 495

Gly Asp Asn Leu Thr Ala Asn Gly Gly Val Val Gly Thr Asn Tyr Ser
500 505 510

Asp Gly Ala Asn Tyr Asp Lys Ile Arg Thr Thr His Pro Ser Trp Ala
515 520 525

Ile Tyr Gly Ser Glu Thr Ala Ser Ala Ile Asn Ser Arg Gly Ile Tyr
530 535 540

Asn Arg Thr Thr Gly Gly Ala Gln Ser Ser Asp Lys Gln Leu Thr Ser
545 550 555 560

Tyr Asp Asn Ser Ala Val Gly Trp Gly Ala Val Ala Ser Ser Ala Trp
565 570 575

Tyr Asp Val Val Gln Arg Asp Phe Val Ala Gly Thr Tyr Val Trp Thr
580 585 590

Gly Phe Asp Tyr Leu Gly Glu Pro Thr Pro Trp Asn Gly Thr Gly Ser
595 600 605

Gly Ala Val Gly Ser Trp Pro Ser Pro Lys Asn Ser Tyr Phe Gly Ile
610 615 620

Val Asp Thr Ala Gly Phe Pro Lys Asp Thr Tyr Tyr Phe Tyr Gln Ser
625 630 635 640

Gln Trp Asn Asp Asp Val His Thr Leu His Ile Leu Pro Ala Trp Asn
645 650 655

Glu Asn Val Val Ala Lys Gly Ser Gly Asn Asn Val Pro Val Val Val
660 665 670

Tyr Thr Asp Ala Ala Lys Val Lys Leu Tyr Phe Thr Pro Lys Gly Ser
675 680 685

Thr Glu Lys Arg Leu Ile Gly Glu Lys Ser Phe Thr Lys Lys Thr Thr
690 695 700

Ala Ala Gly Tyr Thr Tyr Gln Val Tyr Glu Gly Ser Asp Lys Asp Ser
705 710 715 720

Thr Ala His Lys Asn Met Tyr Leu Thr Trp Asn Val Pro Trp Ala Glu
725 730 735

Gly Thr Ile Ser Ala Glu Ala Tyr Asp Glu Asn Asn Arg Leu Ile Pro
740 745 750

Glu Gly Ser Thr Glu Gly Asn Ala Ser Val Thr Thr Thr Gly Lys Ala
755 760 765

Ala Lys Leu Lys Ala Asp Ala Asp Arg Lys Thr Ile Thr Ala Asp Gly

770 775 780

Lys Asp Leu Ser Tyr Ile Glu Val Asp Val Thr Asp Ala Asn Gly His

785 790 795 800

Ile Val Pro Asp Ala Ala Asn Arg Val Thr Phe Asp Val Lys Gly Ala

805 810 815

Gly Lys Leu Val Gly Val Asp Asn Gly Ser Ser Pro Asp His Asp Ser

820 825 830

Tyr Gln Ala Asp Asn Arg Lys Ala Phe Ser Gly Lys Val Leu Ala Ile

835 840 845

Val Gln Ser Thr Lys Glu Ala Gly Glu Ile Thr Val Thr Ala Lys Ala

850 855 860

Asp Gly Leu Gln Ser Ser Thr Val Lys Ile Ala Thr Thr Ala Val Pro

865 870 875 880

Gly Thr Ser Thr Glu Lys Thr Val Arg Ser Phe Tyr Tyr Ser Arg Asn

885 890 895

Tyr Tyr Val Lys Thr Gly Asn Lys Pro Ile Leu Pro Ser Asp Val Glu

900 905 910

Val Arg Tyr Ser Asp Gly Thr Ser Asp Arg Gln Asn Val Thr Trp Asp

915 920 925

Ala Val Ser Asp Asp Gln Ile Ala Lys Ala Gly Ser Phe Ser Val Ala

930 935 940

Gly Thr Val Ala Gly Gln Lys Ile Ser Val Arg Val Thr Met Ile Asp

945 950 955 960

Glu Ile Gly Ala Leu Leu Asn Tyr Ser Ala Ser Thr Pro Val Gly Thr

965 970 975

Pro Ala Val Leu Pro Gly Ser Arg Pro Ala Val Leu Pro Asp Gly Thr

980 985 990

Val Thr Ser Ala Asn Phe Ala Val His Trp Thr Lys Pro Ala Asp Thr

995 1000 1005

Val Tyr Asn Thr Ala Gly Thr Val Lys Val Pro Gly Thr Ala Thr

1010 1015 1020

Val Phe Gly Lys Glu Phe Lys Val Thr Ala Thr Ile Arg Val Gln

1025 1030 1035

Arg Ser Gln Val Thr Ile Gly Ser Ser Val Ser Gly Asn Ala Leu

1040 1045 1050

Arg Leu Thr Gln Asn Ile Pro Ala Asp Lys Gln Ser Asp Thr Leu

1055 1060 1065

Asp Ala Ile Lys Asp Gly Ser Thr Thr Val Asp Ala Asn Thr Gly

1070 1075 1080

Gly Gly Ala Asn Pro Ser Ala Trp Thr Asn Trp Ala Tyr Ser Lys

1085 1090 1095

Ala Gly His Asn Thr Ala Glu Ile Thr Phe Glu Tyr Ala Thr Glu

1100 1105 1110

Gln Gln Leu Gly Gln Ile Val Met Tyr Phe Phe Arg Asp Ser Asn

1115 1120 1125

Ala Val Arg Phe Pro Asp Ala Gly Lys Thr Lys Ile Gln Ile Ser

1130 1135 1140

Ala Asp Gly Lys Asn Trp Thr Asp Leu Ala Ala Thr Glu Thr Ile

1145 1150 1155

Ala Ala Gln Glu Ser Ser Asp Arg Val Lys Pro Tyr Thr Tyr Asp
1160 1165 1170

Phe Ala Pro Val Gly Ala Thr Phe Val Lys Val Thr Val Thr Asn
1175 1180 1185

Ala Asp Thr Thr Thr Pro Ser Gly Val Val Cys Ala Gly Leu Thr
1190 1195 1200

Glu Ile Glu Leu Lys Thr Ala Thr Ser Lys Phe Val Thr Asn Thr
1205 1210 1215

Ser Ala Ala Leu Ser Ser Leu Thr Val Asn Gly Thr Lys Val Ser
1220 1225 1230

Asp Ser Val Leu Ala Ala Gly Ser Tyr Asn Thr Pro Ala Ile Ile
1235 1240 1245

Ala Asp Val Lys Ala Glu Gly Glu Gly Asn Ala Ser Val Thr Val
1250 1255 1260

Leu Pro Ala His Asp Asn Val Ile Arg Val Ile Thr Glu Ser Glu
1265 1270 1275

Asp His Val Thr Arg Lys Thr Phe Thr Ile Asn Leu Gly Thr Glu
1280 1285 1290

Gln Glu Phe

1295

<210> 7

<211> 453

<212> PRT

<213> Bifidobacterium bifidum

<400> 7

Gln Asn Arg Thr Ser Asp Phe Asp Ala Asn Trp Lys Phe Met Leu Ser

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Asp Ser Val Gln Ala Gln Asp Pro Ala Phe Asp Asp Ser Ala Trp Gln

20 25 30

Gln Val Asp Leu Pro His Asp Tyr Ser Ile Thr Gln Lys Tyr Ser Gln

35 40 45

Ser Asn Glu Ala Glu Ser Ala Tyr Leu Pro Gly Gly Thr Gly Trp Tyr

50 55 60

Arg Lys Ser Phe Thr Ile Asp Arg Asp Leu Ala Gly Lys Arg Ile Ala

65 70 75 80

Ile Asn Phe Asp Gly Val Tyr Met Asn Ala Thr Val Trp Phe Asn Gly

	85	90	95
Val Lys Leu Gly Thr His Pro Tyr Gly Tyr Ser Pro Phe Ser Phe Asp			
	100	105	110

Leu Thr Gly Asn Ala Lys Phe Gly Gly Glu Asn Thr Ile Val Val Lys			
	115	120	125

Val Glu Asn Arg Leu Pro Ser Ser Arg Trp Tyr Ser Gly Ser Gly Ile			
	130	135	140

Tyr Arg Asp Val Thr Leu Thr Val Thr Asp Gly Val His Val Gly Asn			
145	150	155	160

Asn Gly Val Ala Ile Lys Thr Pro Ser Leu Ala Thr Gln Asn Gly Gly			
	165	170	175

Asp Val Thr Met Asn Leu Thr Thr Lys Val Ala Asn Asp Thr Glu Ala			
	180	185	190

Ala Ala Asn Ile Thr Leu Lys Gln Thr Val Phe Pro Lys Gly Gly Lys			
	195	200	205

Thr Asp Ala Ala Ile Gly Thr Val Thr Thr Ala Ser Lys Ser Ile Ala			
	210	215	220

Ala Gly Ala Ser Ala Asp Val Thr Ser Thr Ile Thr Ala Ala Ser Pro

225 230 235 240

Lys Leu Trp Ser Ile Lys Asn Pro Asn Leu Tyr Thr Val Arg Thr Glu

245 250 255

Val Leu Asn Gly Gly Lys Val Leu Asp Thr Tyr Asp Thr Glu Tyr Gly

260 265 270

Phe Arg Trp Thr Gly Phe Asp Ala Thr Ser Gly Phe Ser Leu Asn Gly

275 280 285

Glu Lys Val Lys Leu Lys Gly Val Ser Met His His Asp Gln Gly Ser

290 295 300

Leu Gly Ala Val Ala Asn Arg Arg Ala Ile Glu Arg Gln Val Glu Ile

305 310 315 320

Leu Gln Lys Met Gly Val Asn Ser Ile Arg Thr Thr His Asn Pro Ala

325 330 335

Ala Lys Ala Leu Ile Asp Val Cys Asn Glu Lys Gly Val Leu Val Val

340 345 350

Glu Glu Val Phe Asp Met Trp Asn Arg Ser Lys Asn Gly Asn Thr Glu

355

360

365

Asp Tyr Gly Lys Trp Phe Gly Gln Ala Ile Ala Gly Asp Asn Ala Val

370

375

380

Leu Gly Gly Asp Lys Asp Glu Thr Trp Ala Lys Phe Asp Leu Thr Ser

385

390

395

400

Thr Ile Asn Arg Asp Arg Asn Ala Pro Ser Val Ile Met Trp Ser Leu

405

410

415

Gly Asn Glu Met Met Glu Gly Ile Ser Gly Ser Val Ser Gly Phe Pro

420

425

430

Ala Thr Ser Ala Lys Leu Val Ala Trp Thr Lys Ala Ala Asp Ser Thr

435

440

445

Arg Pro Met Thr Tyr

450

<210> 8

<211> 5160

<212> ADN

<213> Secuencia artificial

<220>

<223> Secuencia de nucleótidos que codifica una lactasa extracelular

<400> 8

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gtttattcat cagcggtcga tagcaaaca aatcgacaa gcgatttga tgcgaactgg 120

aaatttatgc tgtcagatag cgttcaagca caagatccgg catttgatga ttcagcatgg 180

caacaagttg atctgccga tgattatagc atcacacaga aatatagcca aagcaatgaa 240

gcagaatcag catatcttcc gggaggcaca ggctggtata gaaaaagctt tacaattgat 300

agagatctgg caggcaaacg cattgcgatt aattttgatg gcgtctatat gaatgcaaca 360

gtctggttta atggcgtaa actgggcaca catccgatg gctattcacc gttttcattt 420

gatctgacag gcaatgcaaa attggcgga gaaaacacaa ttgtcgtaa agttgaaaat 480

agactgccgt catcaagatg gtattcaggc agcggcattt atagagatgt tacactgaca 540

gttacagatg gcgttcatgt tggcaataat ggcgtcgcaa ttaaacacc gtcactggca 600

acacaaaatg gcggagatgt cacaatgaac ctgacaacaa aagtcgcgaa tgatacagaa 660

gcagcagcga acattacact gaaacagaca gttttccga aaggcggaaa aacggatgca 720

gcaattggca cagttacaac agcatcaaaa tcaattgcag caggcgcac agcagatgtt 780

acaagcaca ttacagcagc aagcccgaaa ctgtggtcaa ttaaaaccc gaacctgtat 840

acagttagaa cagaagttct gaacggaggc aaagttctgg atacatatga tacagaatat 900

ggctttcgct ggacaggctt tgatgcaaca tcaggctttt cactgaatgg cgaaaaagtc 960

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<211> 2661

<212> ADN

<213> Secuencia artificial

<220>

<223> Secuencia de nucleótidos que codifica BIF_917

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tttatgctgt cagatagcgt tcaagcaca gatccggcat ttgatgattc agcatggcaa 180

caagttgatc tgccgatga ttatagcatc acacagaaat atagccaaag caatgaagca 240

gaatcagcat atcttcggg aggcacaggc tggtatagaa aaagctttac aattgataga 300

gatctggcag gcaaacgcat tgcgattaat ttgatggcg tctatatgaa tgcaacagtc 360

tggtttaatg gcgttaaact gggcacacat ccgatggct attcaccgtt ttcatttgat 420

ctgacaggca atgcaaaatt tggcggagaa aacacaattg tcgtcaaagt tgaaaataga 480

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gaatcagcat atcttcggg aggcacaggc tggtagataa aaagctttac aattgataga 300

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<213> Secuencia artificial

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<223> Cebador inverso para BIF917

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<212> PRT

<213> Bifidobacterium bifidum

<400> 22

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Ser Asp Phe Asp Ala Asn Trp Lys Phe Met Leu Ser Asp Ser Val Gln

35 40 45

Ala Gln Asp Pro Ala Phe Asp Asp Ser Ala Trp Gln Gln Val Asp Leu

50 55 60

Pro His Asp Tyr Ser Ile Thr Gln Lys Tyr Ser Gln Ser Asn Glu Ala

65 70 75 80

Glu Ser Ala Tyr Leu Pro Gly Gly Thr Gly Trp Tyr Arg Lys Ser Phe

85 90 95

Thr Ile Asp Arg Asp Leu Ala Gly Lys Arg Ile Ala Ile Asn Phe Asp

100 105 110

Gly Val Tyr Met Asn Ala Thr Val Trp Phe Asn Gly Val Lys Leu Gly

115 120 125

Thr His Pro Tyr Gly Tyr Ser Pro Phe Ser Phe Asp Leu Thr Gly Asn

130 135 140

Ala Lys Phe Gly Gly Glu Asn Thr Ile Val Val Lys Val Glu Asn Arg

145 150 155 160

Leu Pro Ser Ser Arg Trp Tyr Ser Gly Ser Gly Ile Tyr Arg Asp Val

165 170 175

Thr Leu Thr Val Thr Asp Gly Val His Val Gly Asn Asn Gly Val Ala

180 185 190

Ile Lys Thr Pro Ser Leu Ala Thr Gln Asn Gly Gly Asp Val Thr Met

195 200 205

Asn Leu Thr Thr Lys Val Ala Asn Asp Thr Glu Ala Ala Ala Asn Ile

210 215 220

Thr Leu Lys Gln Thr Val Phe Pro Lys Gly Gly Lys Thr Asp Ala Ala

225 230 235 240

Ile Gly Thr Val Thr Thr Ala Ser Lys Ser Ile Ala Ala Gly Ala Ser

245 250 255

Ala Asp Val Thr Ser Thr Ile Thr Ala Ala Ser Pro Lys Leu Trp Ser

260 265 270

Ile Lys Asn Pro Asn Leu Tyr Thr Val Arg Thr Glu Val Leu Asn Gly

275 280 285

Gly Lys Val Leu Asp Thr Tyr Asp Thr Glu Tyr Gly Phe Arg Trp Thr

290 295 300

Gly Phe Asp Ala Thr Ser Gly Phe Ser Leu Asn Gly Glu Lys Val Lys

305 310 315 320

Leu Lys Gly Val Ser Met His His Asp Gln Gly Ser Leu Gly Ala Val

325 330 335

Ala Asn Arg Arg Ala Ile Glu Arg Gln Val Glu Ile Leu Gln Lys Met

340 345 350

Gly Val Asn Ser Ile Arg Thr Thr His Asn Pro Ala Ala Lys Ala Leu

355 360 365

Ile Asp Val Cys Asn Glu Lys Gly Val Leu Val Val Glu Glu Val Phe

370 375 380

Asp Met Trp Asn Arg Ser Lys Asn Gly Asn Thr Glu Asp Tyr Gly Lys

385 390 395 400

Trp Phe Gly Gln Ala Ile Ala Gly Asp Asn Ala Val Leu Gly Gly Asp

405 410 415

Lys Asp Glu Thr Trp Ala Lys Phe Asp Leu Thr Ser Thr Ile Asn Arg

420 425 430

Asp Arg Asn Ala Pro Ser Val Ile Met Trp Ser Leu Gly Asn Glu Met

435 440 445

Met Glu Gly Ile Ser Gly Ser Val Ser Gly Phe Pro Ala Thr Ser Ala

450 455 460

Lys Leu Val Ala Trp Thr Lys Ala Ala Asp Ser Thr Arg Pro Met Thr

465 470 475 480

Tyr Gly Asp Asn Lys Ile Lys Ala Asn Trp Asn Glu Ser Asn Thr Met

485 490 495

Gly Asp Asn Leu Thr Ala Asn Gly Gly Val Val Gly Thr Asn Tyr Ser

500 505 510

Asp Gly Ala Asn Tyr Asp Lys Ile Arg Thr Thr His Pro Ser Trp Ala

515 520 525

Ile Tyr Gly Ser Glu Thr Ala Ser Ala Ile Asn Ser Arg Gly Ile Tyr

530 535 540

Asn Arg Thr Thr Gly Gly Ala Gln Ser Ser Asp Lys Gln Leu Thr Ser
545 550 555 560

Tyr Asp Asn Ser Ala Val Gly Trp Gly Ala Val Ala Ser Ser Ala Trp
 565 570 575

Tyr Asp Val Val Gln Arg Asp Phe Val Ala Gly Thr Tyr Val Trp Thr
 580 585 590

Gly Phe Asp Tyr Leu Gly Glu Pro Thr Pro Trp Asn Gly Thr Gly Ser
 595 600 605

Gly Ala Val Gly Ser Trp Pro Ser Pro Lys Asn Ser Tyr Phe Gly Ile
 610 615 620

Val Asp Thr Ala Gly Phe Pro Lys Asp Thr Tyr Tyr Phe Tyr Gln Ser
625 630 635 640

Gln Trp Asn Asp Asp Val His Thr Leu His Ile Leu Pro Ala Trp Asn
 645 650 655

Glu Asn Val Val Ala Lys Gly Ser Gly Asn Asn Val Pro Val Val Val
 660 665 670

Tyr Thr Asp Ala Ala Lys Val Lys Leu Tyr Phe Thr Pro Lys Gly Ser
 675 680 685

Thr Glu Lys Arg Leu Ile Gly Glu Lys Ser Phe Thr Lys Lys Thr Thr
690 695 700

Ala Ala Gly Tyr Thr Tyr Gln Val Tyr Glu Gly Ser Asp Lys Asp Ser
705 710 715 720

Thr Ala His Lys Asn Met Tyr Leu Thr Trp Asn Val Pro Trp Ala Glu
725 730 735

Gly Thr Ile Ser Ala Glu Ala Tyr Asp Glu Asn Asn Arg Leu Ile Pro
740 745 750

Glu Gly Ser Thr Glu Gly Asn Ala Ser Val Thr Thr Thr Gly Lys Ala
755 760 765

Ala Lys Leu Lys Ala Asp Ala Asp Arg Lys Thr Ile Thr Ala Asp Gly
770 775 780

Lys Asp Leu Ser Tyr Ile Glu Val Asp Val Thr Asp Ala Asn Gly His
785 790 795 800

Ile Val Pro Asp Ala Ala Asn Arg Val Thr Phe Asp Val Lys Gly Ala
805 810 815

Gly Lys Leu Val Gly Val Asp Asn Gly Ser Ser Pro Asp His Asp Ser

820 825 830

Tyr Gln Ala Asp Asn Arg Lys Ala Phe Ser Gly Lys Val Leu Ala Ile

835 840 845

Val Gln Ser Thr Lys Glu Ala Gly Glu Ile Thr Val Thr Ala Lys Ala

850 855 860

Asp Gly Leu Gln Ser Ser Thr Val Lys Ile Ala Thr Thr Ala Val Pro

865 870 875 880

Gly Thr Ser Thr Glu Lys Thr Val Arg Ser Phe Tyr Tyr Ser Arg Asn

885 890 895

Tyr Tyr Val Lys Thr Gly Asn Lys Pro Ile Leu Pro Ser Asp Val Glu

900 905 910

Val Arg Tyr Ser Asp Gly Thr Ser Asp Arg Gln Asn Val Thr Trp Asp

915 920 925

Ala Val Ser Asp Asp Gln Ile Ala Lys Ala Gly Ser Phe Ser Val Ala

930 935 940

Gly Thr Val Ala Gly Gln Lys Ile Ser Val Arg Val Thr Met Ile Asp

945 950 955 960

Glu Ile Gly Ala Leu Leu Asn Tyr Ser Ala Ser Thr Pro Val Gly Thr

965 970 975

Pro Ala Val Leu Pro Gly Ser Arg Pro Ala Val Leu Pro Asp Gly Thr

980 985 990

Val Thr Ser Ala Asn Phe Ala Val His Trp Thr Lys Pro Ala Asp Thr

995 1000 1005

Val Tyr Asn Thr Ala Gly Thr Val Lys Val Pro Gly Thr Ala Thr

1010 1015 1020

Val Phe Gly Lys Glu Phe Lys Val Thr Ala Thr Ile Arg Val Gln

1025 1030 1035

Arg Ser Gln Val Thr Ile Gly Ser Ser Val Ser Gly Asn Ala Leu

1040 1045 1050

Arg Leu Thr Gln Asn Ile Pro Ala Asp Lys Gln Ser Asp Thr Leu

1055 1060 1065

Asp Ala Ile Lys Asp Gly Ser Thr Thr Val Asp Ala Asn Thr Gly

1070 1075 1080

Gly Gly Ala Asn Pro Ser Ala Trp Thr Asn Trp Ala Tyr Ser Lys
1085 1090 1095

Ala Gly His Asn Thr Ala Glu Ile Thr Phe Glu Tyr Ala Thr Glu
1100 1105 1110

Gln Gln Leu Gly Gln Ile Val Met Tyr Phe Phe Arg Asp Ser Asn
1115 1120 1125

Ala Val Arg Phe Pro Asp Ala Gly Lys Thr Lys Ile Gln Ile Ser
1130 1135 1140

Ala Asp Gly Lys Asn Trp Thr Asp Leu Ala Ala Thr Glu Thr Ile
1145 1150 1155

Ala Ala Gln Glu Ser Ser Asp Arg Val Lys Pro Tyr Thr Tyr Asp
1160 1165 1170

Phe Ala Pro Val Gly Ala Thr Phe Val Lys Val Thr Val Thr Asn
1175 1180 1185

Ala Asp Thr Thr Thr Pro Ser Gly Val Val Cys Ala Gly Leu Thr
1190 1195 1200

Glu Ile Glu Leu Lys Thr Ala Thr Ser Lys Phe Val Thr Asn Thr
1205 1210 1215

Ser Ala Ala Leu Ser Ser Leu Thr Val Asn Gly Thr Lys Val Ser

1220 1225 1230

Asp Ser Val Leu Ala Ala Gly Ser Tyr Asn Thr Pro Ala Ile Ile

1235 1240 1245

Ala Asp Val Lys Ala Glu Gly Glu Gly Asn Ala Ser Val Thr Val

1250 1255 1260

Leu Pro Ala His Asp Asn Val Ile Arg Val Ile Thr Glu Ser Glu

1265 1270 1275

Asp His Val Thr Arg Lys Thr Phe Thr Ile Asn Leu Gly Thr Glu

1280 1285 1290

Gln Glu Phe Pro Ala Asp Ser Asp Glu Arg Asp Tyr Pro Ala Ala

1295 1300 1305

Asp Met Thr Val Thr Val Gly Ser Glu Gln Thr Ser Gly Thr Ala

1310 1315 1320

Thr Glu Gly Pro Lys Lys Phe Ala Val Asp Gly Asn Thr Ser Thr

1325 1330 1335

Tyr Trp His Ser Asn Trp Thr Pro Thr Thr Val Asn Asp Leu Trp
1340 1345 1350

Ile Ala Phe Glu Leu Gln Lys Pro Thr Lys Leu Asp Ala Leu Arg
1355 1360 1365

Tyr Leu Pro Arg Pro Ala Gly Ser Lys Asn Gly Ser Val Thr Glu
1370 1375 1380

Tyr Lys Val Gln Val Ser Asp Asp Gly Thr Asn Trp Thr Asp Ala
1385 1390 1395

Gly Ser Gly Thr Trp Thr Thr Asp Tyr Gly Trp Lys Leu Ala Glu
1400 1405 1410

Phe Asn Gln Pro Val Thr Thr Lys His Val Arg Leu Lys Ala Val
1415 1420 1425

His Thr Tyr Ala Asp Ser Gly Asn Asp Lys Phe Met Ser Ala Ser
1430 1435 1440

Glu Ile Arg Leu Arg Lys Ala Val Asp Thr Thr Asp Ile Ser Gly
1445 1450 1455

Ala Thr Val Thr Val Pro Ala Lys Leu Thr Val Asp Arg Val Asp
1460 1465 1470

Ala Asp His Pro Ala Thr Phe Ala Thr Lys Asp Val Thr Val Thr

1475 1480 1485

Leu Gly Asp Ala Thr Leu Arg Tyr Gly Val Asp Tyr Leu Leu Asp

1490 1495 1500

Tyr Ala Gly Asn Thr Ala Val Gly Lys Ala Thr Val Thr Val Arg

1505 1510 1515

Gly Ile Asp Lys Tyr Ser Gly Thr Val Ala Lys Thr Phe Thr Ile

1520 1525 1530

Glu Leu Lys Asn Ala Pro Ala Pro Glu Pro Thr Leu Thr Ser Val

1535 1540 1545

Ser Val Lys Thr Lys Pro Ser Lys Leu Thr Tyr Val Val Gly Asp

1550 1555 1560

Ala Phe Asp Pro Ala Gly Leu Val Leu Gln His Asp Arg Gln Ala

1565 1570 1575

Asp Arg Pro Pro Gln Pro Leu Val Gly Glu Gln Ala Asp Glu Arg

1580 1585 1590

Gly Leu Thr Cys Gly Thr Arg Cys Asp Arg Val Glu Gln Leu Arg
1595 1600 1605

Lys His Glu Asn Arg Glu Ala His Arg Thr Gly Leu Asp His Leu
1610 1615 1620

Glu Phe Val Gly Ala Ala Asp Gly Ala Val Gly Glu Gln Ala Thr
1625 1630 1635

Phe Lys Val His Val His Ala Asp Gln Gly Asp Gly Arg His Asp
1640 1645 1650

Asp Ala Asp Glu Arg Asp Ile Asp Pro His Val Pro Val Asp His
1655 1660 1665

Ala Val Gly Glu Leu Ala Arg Ala Ala Cys His His Val Ile Gly
1670 1675 1680

Leu Arg Val Asp Thr His Arg Leu Lys Ala Ser Gly Phe Gln Ile
1685 1690 1695

Pro Ala Asp Asp Met Ala Glu Ile Asp Arg Ile Thr Gly Phe His
1700 1705 1710

Arg Phe Glu Arg His Val Gly
1715 1720

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<211> 30

<212> PRT

<213> Bifidobacterium bifidum

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