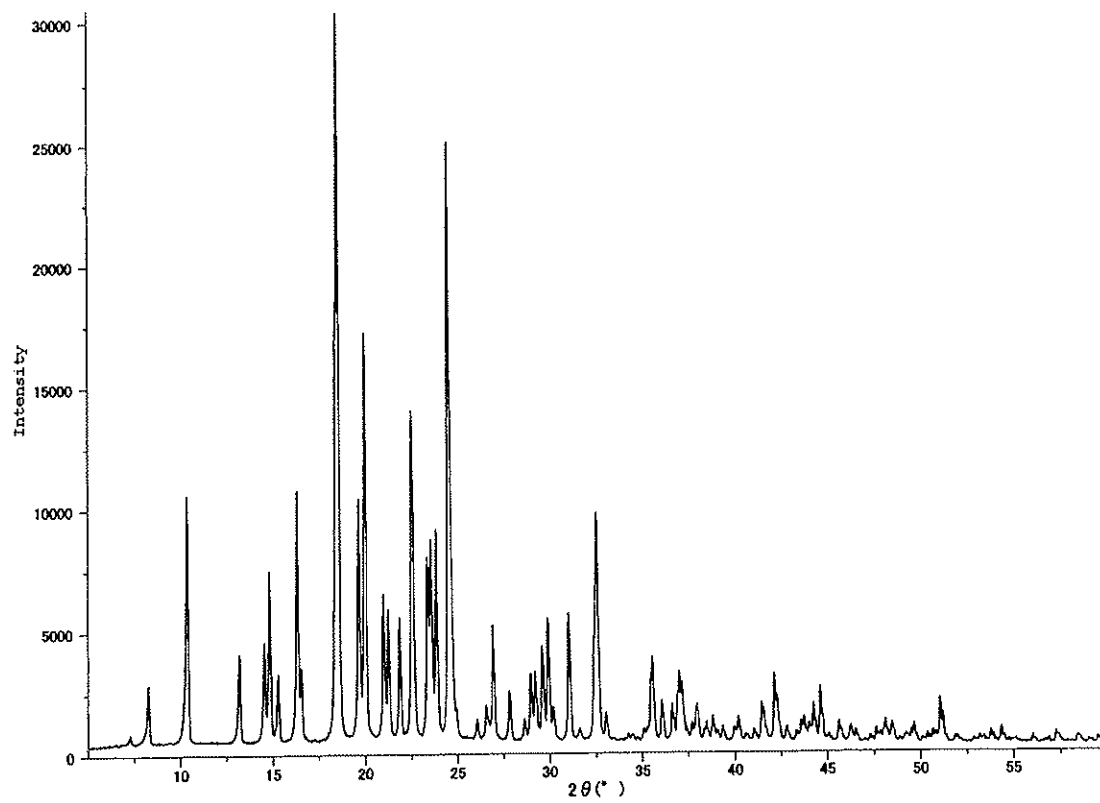
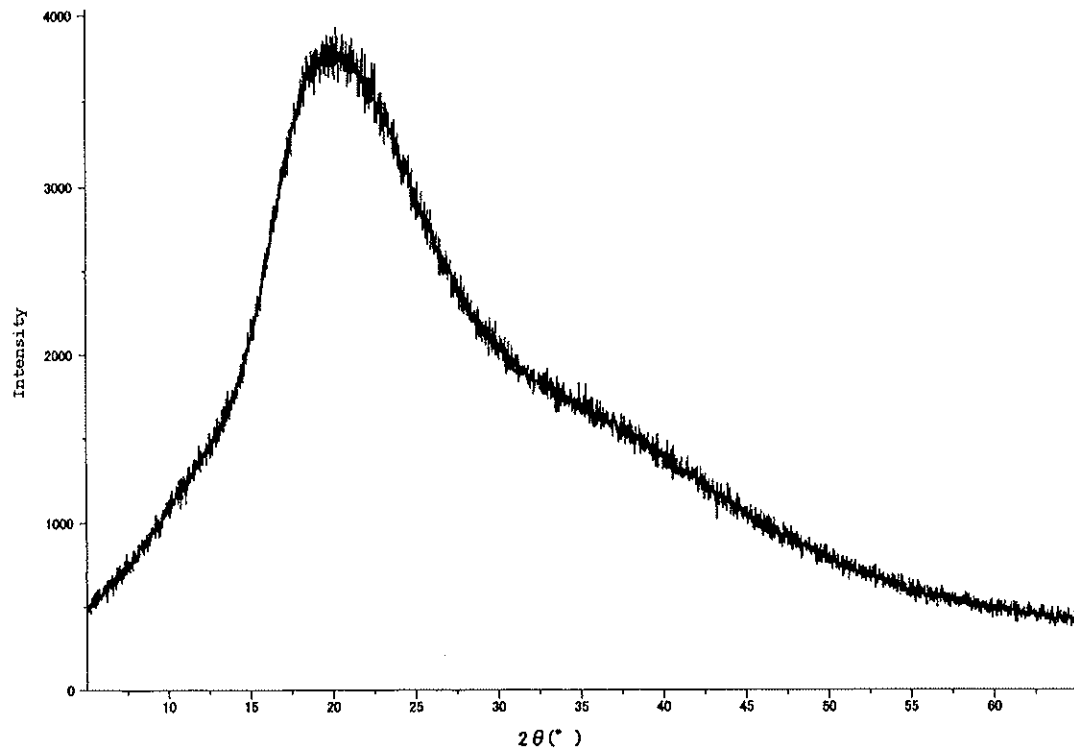


FIG. 1

FIG. 2

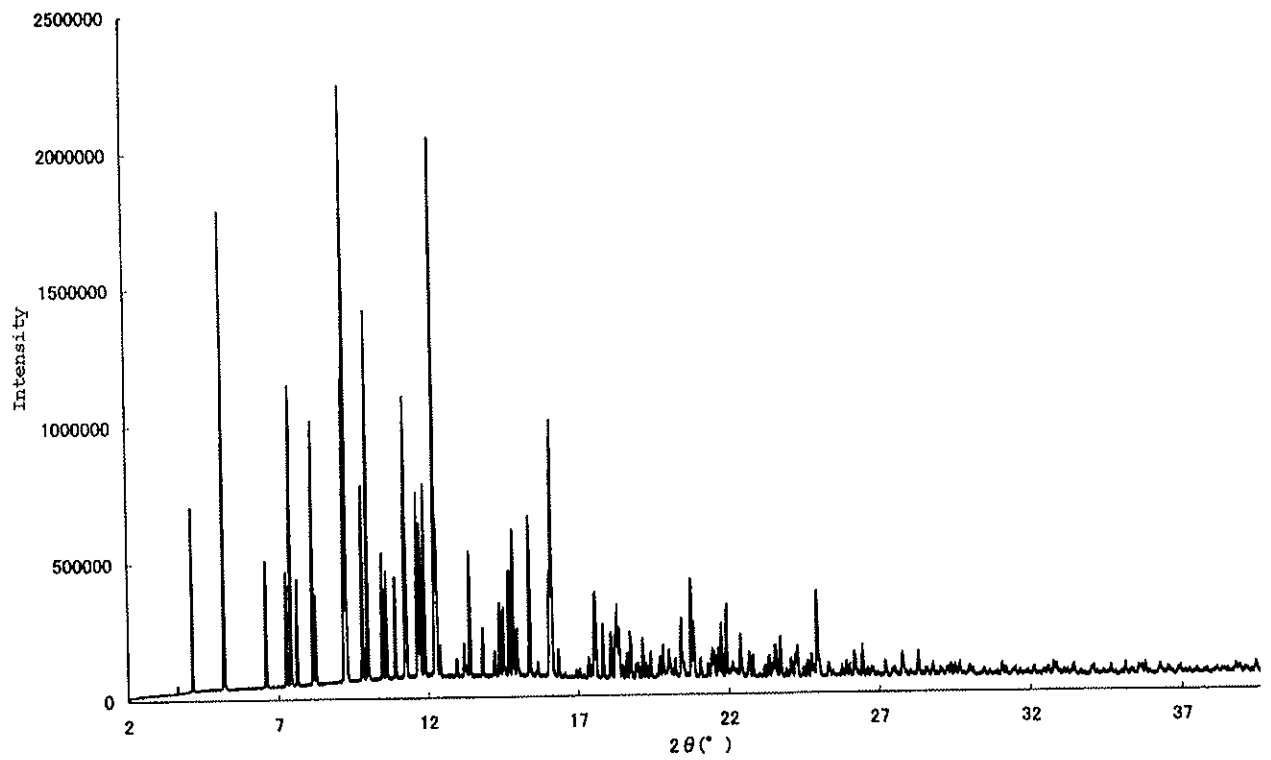


FIG. 3

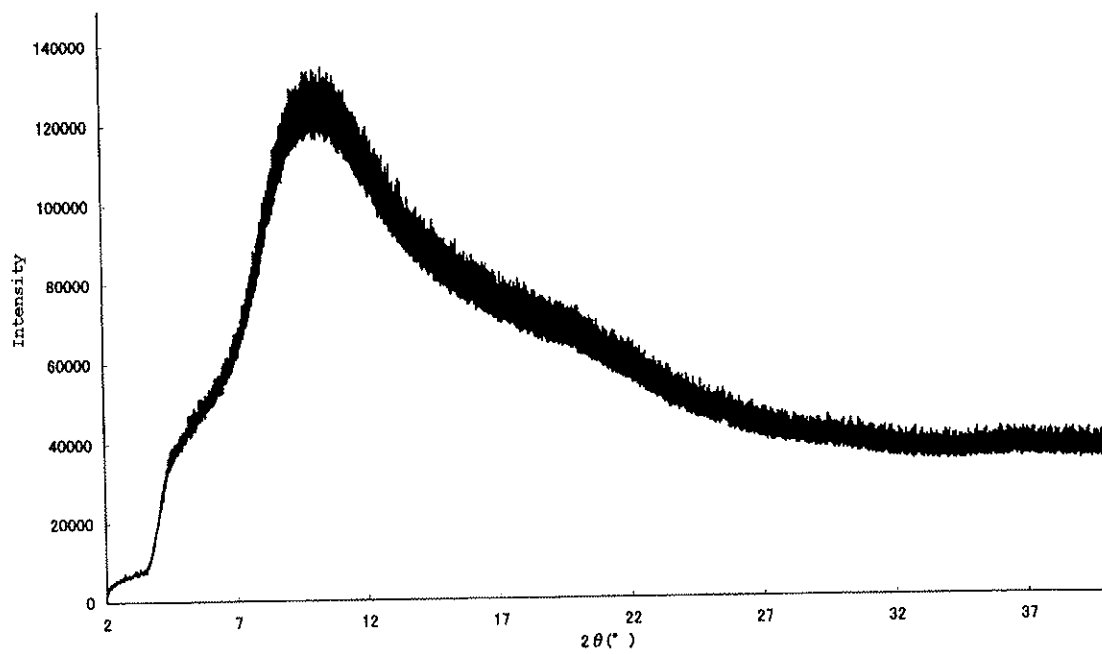


FIG. 4

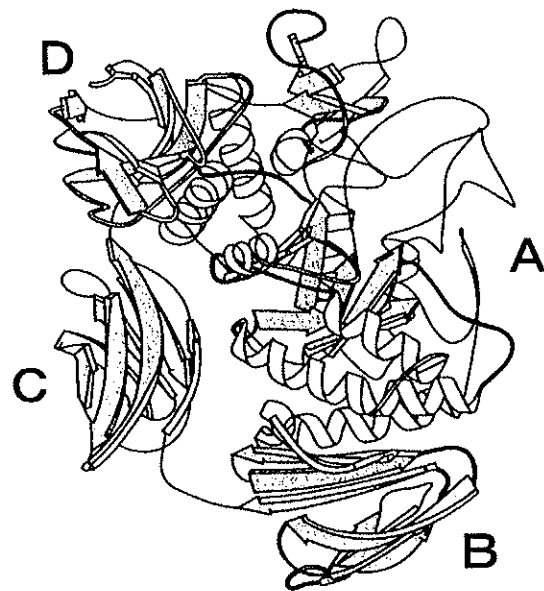


FIG. 5

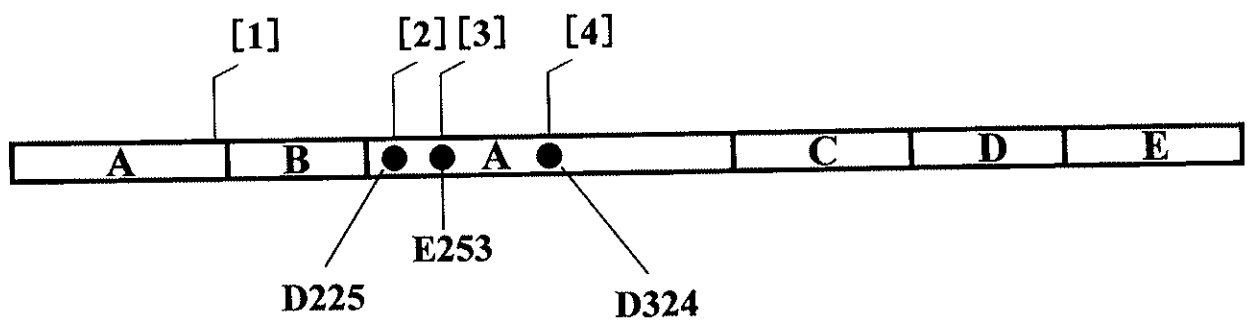


FIG. 6

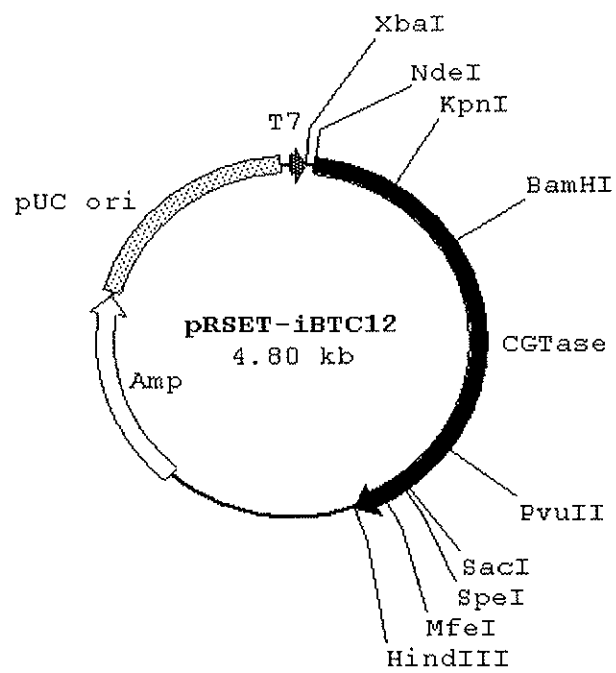


FIG. 7

SequenceListing-W01216
SEQUENCE LISTING

<110> Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo

<120> Particulate composition containing anhydrous crystalline 2-O-alpha-D-glucosyl-L-ascorbic acid, process for producing

the same, and uses thereof

<130> W01216

<160> 2

<210> 1

<211> 680

<212> PRT

<213> Geobacillus stearothermophilus

<400> 1

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Ile Val Val Asp Arg Phe Val Asp Gly Asn Thr Ser Asn Asn Pro Ser
      20      25      30
Gly Ala Leu Phe Ser Ser Gly Cys Thr Asn Leu Arg Lys Tyr Cys Gly
      35      40      45
Gly Asp Trp Gln Gly Ile Ile Asn Lys Ile Asn Asp Gly Tyr Leu Thr
      50      55      60
Asp Met Gly Val Thr Ala Ile Trp Ile Ser Gln Pro Val Glu Asn Val
      65      70      75
Phe Ser Val Met Asn Asp Ala Ser Gly Ser Ala Ser Tyr His Gly Tyr
      80      85      90
Trp Ala Arg Asp Phe Lys Lys Pro Asn Pro Phe Phe Gly Thr Leu Ser
      100     105     110
Asp Phe Gln Arg Leu Val Asp Ala Ala His Ala Lys Gly Ile Lys Val
      115     120     125
Ile Ile Asp Phe Ala Pro Asn His Thr Ser Pro Ala Ser Glu Thr Asn
      130     135     140
Pro Ser Tyr Met Glu Asn Gly Arg Leu Tyr Asp Asn Gly Thr Leu Leu
      145     150     155
Gly Gly Tyr Thr Asn Asp Ala Asn Met Tyr Phe His His Asn Gly Gly
      160     165     170
Thr Thr Phe Ser Ser Leu Glu Asp Gly Ile Tyr Arg Asn Leu Phe Asp
      175     180     185
Leu Ala Asp Leu Asn His Gln Asn Pro Val Ile Asp Arg Tyr Leu Lys
      190     195     200
Asp Ala Val Lys Met Trp Ile Asp Met Gly Ile Asp Gly Ile Arg Met
      205     210     215
Asp Ala Val Lys His Met Pro Phe Gly Trp Gln Lys Ser Leu Met Asp
      220     225     230
Glu Ile Asp Asn Tyr Arg Pro Val Phe Thr Phe Gly Glu Trp Phe Leu
      235     240     245
Ser Glu Asn Glu Val Asp Ala Asn Asn His Tyr Phe Ala Asn Glu Ser
      250     255     260
Gly Met Ser Leu Leu Asp Phe Arg Phe Gly Gln Lys Leu Arg Gln Val
      265     270     275
Leu Arg Asn Asn Ser Asp Asn Trp Tyr Gly Phe Asn Gln Met Ile Gln
      280     285     290
Asp Thr Ala Ser Ala Tyr Asp Glu Val Leu Asp Gln Val Thr Phe Ile
      295     300     305
Asp Asn His Asp Met Asp Arg Phe Met Ile Asp Gly Gly Asp Pro Arg
      310     315     320
Lys Val Asp Met Ala Leu Ala Val Leu Leu Thr Ser Arg Gly Val Pro
      325     330     335
Asn Ile Tyr Tyr Gly Thr Glu Gln Tyr Met Thr Gly Asn Gly Asp Pro
      340     345     350
Asn Asn Arg Lys Met Met Ser Ser Phe Asn Lys Asn Thr Arg Ala Tyr
      355     360     365
Gln Val Ile Gln Lys Leu Ser Ser Leu Arg Arg Asn Asn Pro Ala Leu
      370     375     380
Ala Tyr Gly Asp Thr Glu Gln Arg Trp Ile Asn Gly Asp Val Tyr Val
      385     390     395
Tyr Glu Arg Gln Phe Gly Lys Asp Val Val Leu Val Ala Val Asn Arg
      400     405     410
Ser Ser Ser Ser Asn Tyr Ser Ile Thr Gly Leu Phe Thr Ala Leu Pro
      415     420     425

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SequenceListing-W01216

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 465 470 475 480
 Gly Glu Val Gly Val Trp Ala Tyr Ser Ala Thr Glu Ser Thr Pro Ile
 485 490 495
 Ile Gly His Val Gly Pro Met Met Gly Gln Val Gly His Gln Val Thr
 500 505 510
 Ile Asp Gly Glu Gly Phe Gly Thr Asn Thr Gly Thr Val Lys Phe Gly
 515 520 525
 Thr Thr Ala Ala Asn Val Val Ser Trp Ser Asn Asn Gln Ile Val Val
 530 535 540
 Ala Val Pro Asn Val Ser Pro Gly Lys Tyr Asn Ile Thr Val Gln Ser
 545 550 555 560
 Ser Ser Gly Gln Thr Ser Ala Ala Tyr Asp Asn Phe Glu Val Leu Thr
 565 570 575
 Asn Asp Gln Val Ser Val Arg Phe Val Val Asn Asn Ala Thr Thr Asn
 580 585 590
 Leu Gly Gln Asn Ile Tyr Ile Val Gly Asn Val Tyr Glu Leu Gly Asn
 595 600 605
 Trp Asp Thr Ser Lys Ala Ile Gly Pro Met Phe Asn Gln Val Val Tyr
 610 615 620
 Ser Tyr Pro Thr Trp Tyr Ile Asp Val Ser Val Pro Glu Gly Lys Thr
 625 630 635 640
 Ile Glu Phe Lys Phe Ile Lys Lys Asp Ser Gln Gly Asn Val Thr Trp
 645 650 655
 Glu Ser Gly Ser Asn His Val Tyr Thr Thr Pro Thr Asn Thr Thr Gly
 660 665 670
 Lys Ile Ile Val Asp Trp Gln Asn
 675 680

<210> 2

<211> 2133

<212> DNA

<213> Geobacillus stearothermophilus

<400> 2

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Met Arg Arg Trp Leu Ser Leu Val Leu Ser Met Ser Phe Val Phe Ser	
1 5 10 15	
gca att ttt ata gta tot gat acg cag aaa gtc acc gtt gaa gca gct	96
Ala Ile Phe Ile Val Ser Asp Thr Gln Lys Val Thr Val Glu Ala Ala	
20 25 30	
gga aat ott aat aag gta aac ttt aca toa gat gtt gtc tat caa att	144
Gly Asn Leu Asn Lys Val Asn Phe Thr Ser Asp Val Val Tyr Gln Ile	
35 40 45	
gta gtg gat cga ttt gtg gat gga aat aca tcc aat aat cag agt gga	192
Val Val Asp Arg Phe Val Asp Gly Asn Thr Ser Asn Asn Pro Ser Gly	
50 55 60	
gca tta ttt agc tca gga tgt acg aat tta cgc aag tat tgc ggt gga	240
Ala Leu Phe Ser Ser Gly Cys Thr Asn Leu Arg Lys Tyr Cys Gly Gly	
65 70 75 80	
gat tgg caa ggc atc atc aat aaa att aac gat ggg tat tta aca gat	288
Asp Trp Gln Gly Ile Ile Asn Lys Ile Asn Asp Gly Tyr Leu Thr Asp	
85 90 95	
atg ggt gtg aca gcg ata tgg att tct cag cct gta gaa aat gta ttt	336
Met Gly Val Thr Ala Ile Trp Ile Ser Gln Pro Val Glu Asn Val Phe	
100 105 110	
tct gtg atg aat gat gca ago ggt tca gcc tcc tat cat ggt tat tgg	384
Ser Val Met Asn Asp Ala Ser Gly Ser Ala Ser Tyr His Gly Tyr Trp	
115 120 125	
gcg cgc gat ttc aaa aag cca aac cgc ttt ttt ggt acc ctc agt gat	432
Ala Arg Asp Phe Lys Lys Pro Asn Pro Phe Phe Gly Thr Leu Ser Asp	
130 135 140	
ttc caa cgt tta gtt gat gcc gca cat gca aaa gga ata aag gta att	480
Phe Gln Arg Leu Val Asp Ala Ala His Ala Lys Gly Ile Lys Val Ile	

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Ile Asp Phe Ala Pro Asn His Thr Ser Pro Ala Ser Glu Thr Asn Pro	165	170	175	
tct tat atg gaa aac gga oga ctg tac gat aat ggg aca ttg ctt ggc				576
Ser Tyr Met Glu Asn Gly Arg Leu Tyr Asp Asn Gly Thr Leu Leu Gly	180	185	190	
ggt tac aca aat gat gcc aac atg tat ttt cac cat aac ggt gga aca				624
Gly Tyr Thr Asn Asp Ala Asn Met Tyr Phe His His Asn Gly Gly Thr	195	200	205	
acg ttt tcc agc tta gag gat ggg att tat oga aat ctg ttt gac ttg				672
Thr Phe Ser Ser Leu Glu Asp Gly Ile Tyr Arg Asn Leu Phe Asp Leu	210	215	220	
gog gac ctt aac cat oag aac cct gtt att gat agg tat tta aaa gat				720
Ala Asp Leu Asn His Gln Asn Pro Val Ile Asp Arg Tyr Leu Lys Asp	225	230	235	240
gca gta aaa atg tgg ata gat atg ggg att gat ggt atc cgt atg gat				768
Ala Val Lys Met Trp Ile Asp Met Gly Ile Asp Gly Ile Arg Met Asp	245	250	255	
gog gtg aag cac atg cgg ttt gga tgg caa aaa tot ctg atg gat gag				816
Ala Val Lys His Met Pro Phe Gly Trp Gln Lys Ser Leu Met Asp Glu	260	265	270	
att gat aac tat cgt cct gtc ttt aog ttt ggg gag tgg tit ttg tca				864
Ile Asp Asn Tyr Arg Pro Val Phe Thr Phe Gly Glu Trp Phe Leu Ser	275	280	285	
gaa aat gaa gtg gac gcg aac aat oat tac ttt gcc aat gaa agt gga				912
Glu Asn Glu Val Asp Ala Asn Asn His Tyr Phe Ala Asn Glu Ser Gly	290	295	300	
atg agt ttg ctc gat ttt cgt ttc gga caa aag ott cgt caa gta ttg				960
Met Ser Leu Leu Asp Phe Arg Phe Gly Gln Lys Leu Arg Gln Val Leu	305	310	315	320
ogc aat aac agc gat aat tgg tat ggc ttt aat caa atg att caa gat				1008
Arg Asn Asn Ser Asp Asn Trp Tyr Gly Phe Asn Gln Met Ile Gln Asp	325	330	335	
aog gca tca gca tat gac gag gtt ctc gat caa gta aca ttc ata gac				1056
Thr Ala Ser Ala Tyr Asp Glu Val Leu Asp Gln Val Thr Phe Ile Asp	340	345	350	
aac cat gat atg gat cgg ttt atg att gac gga gga gat cgg ogc aag				1104
Asn His Asp Met Asp Arg Phe Met Ile Asp Gly Gly Asp Pro Arg Lys	355	360	365	
gtg gat atg gca ctt got gta tta ttg aca tcc cgt ggc gta cgg aat				1152
Val Asp Met Ala Leu Ala Val Leu Leu Thr Ser Arg Gly Val Pro Asn	370	375	380	
att tac tat ggt aca gag caa tac atg acc ggt aac ggo gat oca aac				1200
Ile Tyr Tyr Gly Thr Glu Gln Tyr Met Thr Gly Asn Gly Asp Pro Asn	385	390	395	400
aat cgt aag atg atg agt tca ttc aat aaa aat act ogc gog tat caa				1248
Asn Arg Lys Met Met Ser Ser Phe Asn Lys Asn Thr Arg Ala Tyr Gln	405	410	415	
gtg att caa aaa ota tot tot ctc oga oga aac aat cgg gog tta got				1296
Val Ile Gln Lys Leu Ser Ser Leu Arg Arg Asn Asn Pro Ala Leu Ala	420	425	430	
tat ggt gat acc gaa cag cgt tgg atc aat ggc gat gtg tat gtg tat				1344
Tyr Gly Asp Thr Glu Gln Arg Trp Ile Asn Gly Asp Val Tyr Val Tyr	435	440	445	
gag oga cag ttt ggc aaa gat gtt gtg tta gtt gcc gtt aat cgt agt				1392
Glu Arg Gln Phe Gly Lys Asp Val Val Leu Val Ala Val Asn Arg Ser				

SequenceListing-W01216
460

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	gga aca tat acg gat cag ott ggc ggt ott tta gac gga aat aca att Gly Thr Tyr Thr Asp Gln Leu Gly Gly Leu Leu Asp Gly Asn Thr Ile 485 490 495	1488
	caa gtc ggt tca aat gga tca gtt aat gca ttt gac tta gga cgg ggg Gln Val Gly Ser Asn Gly Ser Val Asn Ala Phe Asp Leu Gly Pro Gly 500 505 510	1536
	gaa gtc ggt gta tgg gca tac agt gca aca gaa agc acg cca att att Glu Val Gly Val Trp Ala Tyr Ser Ala Thr Glu Ser Thr Pro Ile Ile 515 520 525	1584
	ggt cat gtt gga cgg atg atg ggg caa gtc ggt cat cca gta acc att Gly His Val Gly Pro Met Met Gly Gln Val Gly His Gln Val Thr Ile 530 535 540	1632
	gat ggc gaa gga ttc gga aca aat acg ggc act gtg aag ttc gga acg Asp Gly Glu Gly Phe Gly Thr Asn Thr Gly Thr Val Lys Phe Gly Thr 545 550 555 560	1680
	aca got gcc aat gtt gtg tot tgg tot aac aat caa atc gtt gtg gct Thr Ala Ala Asn Val Val Ser Trp Ser Asn Asn Gln Ile Val Val Ala 565 570 575	1728
	gta cca aat gtg tca cca gga aaa tat aat att acc gtc caa tca tca Val Pro Asn Val Ser Pro Gly Lys Tyr Asn Ile Thr Val Gln Ser Ser 580 585 590	1776
	agc ggt caa acg agt ggg got tat gat aac ttt gaa gta cta aca aat Ser Gly Gln Thr Ser Ala Ala Tyr Asp Asn Phe Glu Val Leu Thr Asn 595 600 605	1824
	gat caa gtg tca gtg ogg ttt gtt gtt aat aac ggg act acc aat cta Asp Gln Val Ser Val Arg Phe Val Val Asn Asn Ala Thr Thr Asn Leu 610 615 620	1872
	ggg caa aat ata tac att gtt ggc aac gta tat gag ctc ggc aac tgg Gly Gln Asn Ile Tyr Ile Val Gly Asn Val Tyr Glu Leu Gly Asn Trp 625 630 635 640	1920
	gac act agt aag gca atc ggt cca atg ttc aat caa gtg gtt tac tco Asp Thr Ser Lys Ala Ile Gly Pro Met Phe Asn Gln Val Val Tyr Ser 645 650 655	1968
	tat cot aca tgg tat ata gat gtc agt gtc cca gaa gga aag aca att Tyr Pro Thr Trp Tyr Ile Asp Val Ser Val Pro Glu Gly Lys Thr Ile 660 665 670	2016
	gag ttt aag ttt att aaa aaa gac ago caa ggt aat gtc act tgg gaa Glu Phe Lys Phe Ile Lys Lys Asp Ser Gln Gly Asn Val Thr Trp Glu 675 680 685	2064
	agt ggt tca aat cat gtt tat acg aca cca acg aat aca acc gga aaa Ser Gly Ser Asn His Val Tyr Thr Thr Pro Thr Asn Thr Thr Gly Lys 690 695 700	2112
	att ata gtg gat tgg oag aac Ile Ile Val Asp Trp Gln Asn 705 710	2133