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<213> *Spinacia oleracea*

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<212> PRT
<213> Spinacia oleracea

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Ile Gln Ala Gly Val Met Arg Glu Leu Thr Ser Glu Gln Gln Gly Phe
50      55      60
Ile Ala Asp Leu Lys Asp Val Val Tyr Asp Ala Asp Asp Leu Phe Asp
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Lys Leu Leu Thr Arg Ala Glu Arg Lys Gln Ile Asp Gly Asn Glu Ile
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Ser Glu Lys Val Arg Arg Phe Phe Ser Ser Ser Asn Lys Ile Gly Gln
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Ala Tyr Tyr Met Ser Arg Lys Val Lys Glu Ile Lys Lys Gln Leu Asp
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Glu Ile Val Asp Arg His Thr Lys Phe Gly Phe Ser Ala Glu Phe Ile
130     135     140
Pro Val Cys Arg Gly Arg Gly Asn Glu Arg Glu Thr Arg Ser Tyr Ile
145     150     155     160
Asp Val Lys Asn Ile Leu Gly Arg Asp Lys Asp Lys Asn Asp Ile Ile
165     170     175
Asp Arg Leu Leu Asn Arg Asn Gly Asn Glu Ala Cys Ser Phe Leu Thr
180     185     190
Ile Val Gly Ala Gly Gly Leu Gly Lys Thr Ala Leu Ala Gln Leu Val
195     200     205
Phe Asn Asp Glu Arg Val Lys Ile Glu Phe His Asp Leu Arg Tyr Trp
210     215     220
Val Cys Val Ser Asp Gln Asp Gly Gly Gln Phe Asp Val Lys Glu Ile
225     230     235     240
Leu Cys Lys Ile Leu Glu Val Val Thr Lys Glu Lys Val Asp Asn Ser
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Lys Lys Tyr Phe Leu Val Leu Asp Asp Val Trp Asn Glu Asp Arg Glu

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Ala Ile Ser Leu Ser His Leu Val Asp Ile Gln Leu Trp His Cys Arg
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Asn Leu Gln Glu Met Pro Val Leu Ser Lys Leu Pro His Leu Lys Ser
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Leu Glu Leu Tyr Asn Leu Ile Ser Leu Glu Tyr Met Glu Ser Thr Ser
          835          840          845
Arg Ser Ser Ser Ser Asp Thr Glu Ala Ala Thr Pro Glu Leu Pro Thr
          850          855          860
Phe Phe Pro Ser Leu Glu Lys Leu Thr Leu Trp Arg Leu Asp Lys Leu
865          870          875          880
Lys Gly Phe Gly Asn Arg Arg Ser Ser Ser Phe Pro Arg Leu Ser Lys
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Leu Glu Ile Trp Lys Cys Pro Asp Leu Thr Ser Phe Pro Ser Cys Pro
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Ser Leu Glu Glu Leu Glu Leu Lys Glu Asn Asn Glu Ala Leu Gln Ile
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Ile Val Lys Ile Thr Thr Thr Arg Gly Lys Glu Glu Lys Glu Glu Asp
          930          935          940
Lys Asn Ala Gly Val Gly Asn Ser Gln Asp Asp Asp Asn Val Lys Leu
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Trp Thr Val Glu Ile Asp Asn Leu Gly Tyr Leu Lys Ser Leu Pro Thr
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Gln Glu Asp Glu Gly Glu Asp Asn Ile Ile Phe Trp Lys Ser Phe Pro
          995          1000          1005
Gln Asn Leu Arg Ser Leu Glu Ile Glu Asn Ser Tyr Lys Met Thr Ser
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Leu Pro Met Gly Met Gln Tyr Leu Thr Ser Leu Gln Thr Leu Tyr Leu
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His His Cys Tyr Glu Leu Asn Ser Leu Pro Glu Trp Ile Ser Ser Leu
          1045          1050          1055
Ser Ser Leu Gln Ser Leu His Ile Gly Lys Cys Pro Ala Leu Lys Ser
          1060          1065          1070
Leu Pro Glu Ala Met Arg Asn Leu Thr Ser Leu Gln Thr Leu Gly Ile
          1075          1080          1085
Ser Arg Cys Pro Asp Leu Ile Glu Arg Cys Glu Glu Pro Asn Gly Glu
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<212> PRT

<213> Spinacia oleracea

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Ile Gln Ala Gly Val Met Arg Glu Leu Thr Ser Glu Gln Gln Gly Phe
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Ile Ala Asp Leu Lys Asp Val Val Tyr Asp Ala Asp Asp Leu Phe Asp
65          70          75          80
Lys Leu Leu Thr Arg Ala Glu Arg Lys Gln Ile Asp Gly Asn Glu Ile

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Glu	Ile	Val	Asp	Arg	His	Thr	Lys	Phe	Gly	Phe	Ser	Ala	Glu	Phe	Ile
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Pro	Val	Cys	Arg	Gly	Arg	Gly	Asn	Glu	Arg	Glu	Thr	Arg	Ser	Tyr	Ile
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Asp	Val	Lys	Asn	Ile	Leu	Gly	Arg	Asp	Lys	Asp	Lys	Asn	Asp	Ile	Ile
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Val	Cys	Val	Ser	Asp	Gln	Asp	Gly	Gly	Gln	Phe	Asp	Val	Lys	Glu	Ile
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Gly	Asn	Gly	Asp	Asn	Lys	Ile	Leu	Pro	Ile	Leu	Lys	Leu	Ser	Tyr	His
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			580						585				590		

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	595						600					605			
Pro	Asp	Ala	Ile	Thr	Arg	Leu	His	Asn	Leu	Gln	Thr	Leu	Leu	Leu	Lys
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Lys	Leu	Arg	His	Leu	Asp	Leu	Arg	Cys	Ser	Asp	Leu	Lys	Glu	Leu	Pro
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Cys	Asp	Asp	Leu	Ile	Gly	Val	Pro	Leu	Gly	Met	Asp	Arg	Leu	Ile	Ser
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Leu	Arg	Val	Leu	Pro	Phe	Phe	Val	Val	Gly	Arg	Lys	Glu	Gln	Ser	Asp
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Asp	Thr	Gly	Gly	Ala	Gly	Tyr	Leu	Lys	Ser	Met	Lys	His	Leu	Thr	Gly
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Val	Asp	Ile	Thr	Phe	Asp	Gly	Gly	Cys	Val	Asn	Pro	Glu	Ala	Val	Leu
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Ala	Thr	Leu	Glu	Pro	Pro	Ser	Asn	Ile	Lys	Arg	Leu	Glu	Met	Trp	His
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Tyr	Ser	Gly	Thr	Thr	Ile	Pro	Val	Trp	Gly	Arg	Ala	Glu	Ile	Asn	Trp
785					790					795					800
Ala	Ile	Ser	Leu	Ser	His	Leu	Val	Asp	Ile	Gln	Leu	Trp	His	Cys	Arg
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Leu	Glu	Leu	Tyr	Asn	Leu	Ile	Ser	Leu	Glu	Tyr	Met	Glu	Ser	Thr	Ser
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Arg	Ser	Ser	Ser	Ser	Asp	Thr	Glu	Ala	Ala	Thr	Pro	Glu	Leu	Pro	Thr
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Phe	Phe	Pro	Ser	Leu	Glu	Lys	Leu	Thr	Leu	Trp	Arg	Leu	Asp	Lys	Leu
865					870					875					880
Lys	Gly	Phe	Gly	Asn	Arg	Arg	Ser	Ser	Ser	Phe	Pro	Arg	Leu	Ser	Lys
			885					890						895	
Leu	Glu	Ile	Trp	Lys	Cys	Pro	Asp	Leu	Thr	Ser	Phe	Pro	Ser	Cys	Pro
		900						905					910		
Ser	Leu	Glu	Glu	Leu	Glu	Leu	Lys	Glu	Asn	Asn	Glu	Ala	Leu	Gln	Ile
	915						920					925			
Ile	Val	Lys	Ile	Thr	Thr	Thr	Arg	Gly	Lys	Glu	Glu	Lys	Glu	Glu	Asp
	930					935					940				
Lys	Asn	Ala	Gly	Val	Gly	Asn	Ser	Gln	Asp	Asp	Asp	Asn	Val	Lys	Leu
945					950					955					960
Trp	Thr	Val	Glu	Ile	Asp	Asn	Leu	Gly	Tyr	Leu	Lys	Ser	Leu	Pro	Thr
			965					970						975	
Asn	Cys	Leu	Thr	Leu	Leu	Asp	Ser	Leu	Glu	Leu	Ser	Asn	Ile	Glu	Asp
		980						985					990		
Gln	Glu	Asp	Glu	Gly	Glu	Asp	Asn	Ile	Ile	Phe	Trp	Lys	Ser	Phe	Pro
	995						1000					1005			
Gln	Asn	Leu	Arg	Ser	Leu	Glu	Ile	Glu	Asn	Ser	Tyr	Lys	Met	Thr	Ser
	1010					1015					1020				
Leu	Pro	Met	Gly	Met	Gln	Tyr	Leu	Thr	Ser	Leu	Gln	Thr	Leu	Tyr	Leu
1025					1030					1035					1040
His	His	Cys	Tyr	Glu	Leu	Asn	Ser	Leu	Pro	Glu	Trp	Ile	Ser	Ser	Leu
			1045						1050					1055	
Ser	Ser	Leu	Gln	Ser	Leu	His	Ile	Gly	Lys	Cys	Pro	Ala	Leu	Lys	Ser
		1060						1065					1070		
Leu	Pro	Glu	Ala	Met	Arg	Asn	Leu	Thr	Ser	Leu	Gln	Thr	Leu	Gly	Ile
	1075						1080					1085			
Ser	Arg	Cys	Pro	Asp	Leu	Ile	Glu	Arg	Cys	Glu	Glu	Pro	Asn	Gly	Glu

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 <213> Artificial Sequence

<220>
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<210> 7
 <211> 19
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer

<400> 7
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<210> 8
 <211> 18
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer

<400> 8
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<210> 9
 <211> 1298
 <212> DNA
 <213> Spinacia oleracea

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 ggcacttgga tttatgggggt tgtgatgatt tgattggtgt gccattggga atggataggc 360

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taattagtct tagagtactg ccattctttg tgggtgggtag gaaggaacaa agtgatgatg      420
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<210> 10
<211> 432
<212> PRT
<213> Spinacia oleracea

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20     25     30
Leu Ser Tyr Asn Lys Asp Leu Leu Ile Leu Pro Asp Ala Ile Thr Arg
35     40     45
Leu His Asn Leu Gln Thr Leu Leu Lys Glu Cys Arg Ser Leu Lys
50     55     60
Glu Leu Pro Lys Asp Phe Cys Lys Leu Val Lys Leu Arg His Leu Asp
65     70     75     80
Leu Arg Cys Ser Asp Leu Lys Glu Leu Pro Lys Asp Phe Cys Lys Leu
85     90     95
Val Lys Leu Arg His Leu Asp Leu Trp Gly Cys Asp Asp Leu Ile Gly
100    105    110
Val Pro Leu Gly Met Asp Arg Leu Ile Ser Leu Arg Val Leu Pro Phe
115    120    125
Phe Val Val Gly Arg Lys Glu Gln Ser Asp Asp Asp Glu Leu Lys Ala
130    135    140
Leu Lys Gly Leu Thr Glu Ile Lys Gly Ser Ile Arg Ile Arg Ile Tyr
145    150    155    160
Ser Lys Tyr Arg Ile Val Glu Gly Met Asn Asp Thr Gly Gly Ala Gly
165    170    175

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Tyr	Leu	Lys	Ser	Met	Lys	His	Leu	Thr	Gly	Val	Asp	Ile	Thr	Phe	Asp
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Gly	Gly	Cys	Val	Asn	Pro	Glu	Ala	Val	Leu	Ala	Thr	Leu	Glu	Pro	Pro
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Ser	Asn	Ile	Lys	Arg	Leu	Glu	Met	Trp	His	Tyr	Ser	Gly	Thr	Thr	Ile
	210					215					220				
Pro	Val	Trp	Gly	Arg	Ala	Glu	Ile	Asn	Trp	Ala	Ile	Ser	Leu	Ser	His
225				230						235					240
Leu	Val	Asp	Ile	Gln	Leu	Trp	His	Cys	Arg	Asn	Leu	Gln	Glu	Met	Pro
				245					250					255	
Val	Leu	Ser	Lys	Leu	Pro	His	Leu	Lys	Ser	Leu	Glu	Leu	Tyr	Asn	Leu
			260					265					270		
Ile	Ser	Leu	Glu	Tyr	Met	Glu	Ser	Thr	Ser	Arg	Ser	Ser	Ser	Ser	Asp
	275						280					285			
Thr	Glu	Ala	Ala	Thr	Pro	Glu	Leu	Pro	Thr	Phe	Phe	Pro	Ser	Leu	Glu
	290					295					300				
Lys	Leu	Thr	Leu	Trp	Arg	Leu	Asp	Lys	Leu	Lys	Gly	Phe	Gly	Asn	Arg
305					310					315					320
Arg	Ser	Ser	Ser	Phe	Pro	Arg	Leu	Ser	Lys	Leu	Glu	Ile	Trp	Lys	Cys
				325					330					335	
Pro	Asp	Leu	Thr	Ser	Phe	Pro	Ser	Cys	Pro	Ser	Leu	Glu	Glu	Leu	Glu
			340					345					350		
Leu	Lys	Glu	Asn	Asn	Glu	Ala	Leu	Gln	Ile	Ile	Val	Lys	Ile	Thr	Thr
		355					360					365			
Thr	Arg	Gly	Lys	Glu	Glu	Lys	Glu	Glu	Asp	Lys	Asn	Ala	Gly	Val	Gly
	370					375					380				
Asn	Ser	Gln	Asp	Asp	Asp	Asn	Val	Lys	Leu	Trp	Thr	Val	Glu	Ile	Asp
385					390					395					400
Asn	Leu	Gly	Tyr	Leu	Lys	Ser	Leu	Pro	Thr	Asn	Cys	Leu	Thr	Leu	Leu
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<210> 11
 <211> 1597
 <212> DNA
 <213> Spinacia oleracea

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 ccctgatgca attacaagac tgcataactt gcagacacta cttttagaag attgcagaag 300
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 agttgaaggc atgaatggca caggaggagg agctgggtat ttgaagagca tgaaacatct 600
 cacgggggtt aatattacat ttgatgaagg tggatgtgtt aaccctgaag ctgtgtat 660

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<210> 12

<211> 532

<212> PRT

<213> *Spinacia oleracea*

<400> 12

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20          25          30
Val Asp Ser Gln Ile Asp Asn Trp Met Cys Leu Arg Val Leu Asp Leu
35          40          45
Ser Asp Ser Cys Val Lys Asp Leu Ser Asp Ser Ile Gly Lys Leu Leu
50          55          60
His Leu Arg Tyr Leu Asn Leu Ser Ser Asn Ile Lys Leu Glu Ile Ile
65          70          75          80
Pro Asp Ala Ile Thr Arg Leu His Asn Leu Gln Thr Leu Leu Leu Glu
85          90          95
Asp Cys Arg Ser Leu Lys Glu Leu Pro Lys Asp Phe Cys Lys Leu Val
100          105          110
Lys Leu Arg His Leu Glu Leu Gln Gly Cys His Asp Leu Ile Gly Met
115          120          125
Ser Phe Gly Met Asp Lys Leu Thr Ser Leu Arg Ile Leu Pro Asn Ile
130          135          140
Val Val Gly Arg Lys Glu Gln Ser Val Asp Asp Glu Leu Lys Ala Leu
145          150          155          160
Lys Gly Leu Thr Glu Ile Lys Gly Ser Ile Asp Ile Thr Ile Tyr Ser
165          170          175

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Lys Tyr Arg Arg Val Glu Gly Met Asn Gly Thr Gly Gly Gly Ala Gly
 180 185 190
 Tyr Leu Lys Ser Met Lys His Leu Thr Gly Val Asn Ile Thr Phe Asp
 195 200 205
 Glu Gly Gly Cys Val Asn Pro Glu Ala Val Tyr Leu Lys Ser Met Lys
 210 215 220
 His Leu Thr Arg Val Ile Ile Ile Phe Asp Tyr Lys Gly Gly Cys Val
 225 230 235 240
 Asn Pro Glu Ala Val Leu Ala Thr Leu Glu Pro Pro Ser Asn Ile Lys
 245 250 255
 Arg Leu Glu Met Trp His Tyr Ser Gly Thr Thr Ile Pro Val Trp Gly
 260 265 270
 Arg Ala Glu Ile Asn Trp Ala Ile Ser Leu Ser His Leu Val Asp Ile
 275 280 285
 Thr Leu Glu Asp Cys Tyr Asn Leu Gln Glu Met Pro Val Leu Ser Lys
 290 295 300
 Leu Pro His Leu Lys Ser Leu Glu Leu Thr Glu Leu Asp Asn Leu Glu
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 Tyr Met Glu Ser Arg Ser Ser Ser Ser Ser Ser Asp Thr Glu Ala Ala
 325 330 335
 Thr Pro Glu Leu Pro Thr Phe Phe Pro Ser Leu Glu Lys Leu Thr Leu
 340 345 350
 Trp Arg Leu Asp Lys Leu Lys Gly Phe Gly Asn Arg Arg Ser Ser Ser
 355 360 365
 Phe Pro Arg Leu Ser Lys Leu Glu Ile Trp Lys Cys Pro Asp Leu Thr
 370 375 380
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 385 390 395 400
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 405 410 415
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 420 425 430
 Asp Asp Asn Val Lys Leu Trp Lys Val Glu Ile Asp Asn Leu Gly Tyr
 435 440 445
 Leu Lys Ser Leu Pro Thr Asn Cys Leu Thr His Leu Asp Leu Thr Ile
 450 455 460
 Ser Asp Ser Lys Glu Gly Glu Gly Glu Trp Glu Val Gly Asp Ala Phe
 465 470 475 480
 Gln Lys Cys Val Ser Ser Leu Arg Ser Leu Thr Ile Ile Gly Asn His
 485 490 495
 Gly Ile Asn Lys Val Lys Arg Leu Ser Gly Arg Thr Gly Leu Glu His
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 Asp Glu Gly Glu
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<210> 13

<211> 8117

<212> DNA

<213> *Spinacia oleracea*

<400> 13

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