

pctau2013000426-seq1
SEQUENCE LISTING

<110> Commonwealth Scientific and Industrial Research
Organisation
Grains Research and Development Corporation

<120> High oleic acid oils

<130> 513426

<150> US 61/638,447

<151> 2012-04-25

<150> AU 2012903992

<151> 2012-09-11

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<170> PatentIn version 3.5

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<212> DNA

<213> Carthamus tinctorius

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<212> DNA

<213> Carthamus tinctorius

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<213> Carthamus tinctorius

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<212> DNA

<213> Carthamus tinctorius

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<210> 27
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 <212> PRT
 <213> Carthamus tinctorius

<400> 27

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Ile Ser Asp Ile Lys Gln Ala Ile Pro Ser His Cys Phe Asn Arg Ser
 35 40 45

Leu Ile Arg Ser Phe Ser Tyr Ile Val Tyr Asp Leu Ala Ile Ala Phe
 50 55 60

Val Phe Tyr Tyr Leu Ala Thr Thr Tyr Ile His Arg Leu Pro Thr Pro
 65 70 75 80

Phe Ser Tyr Leu Ala Trp Leu Ala Tyr Trp Ile Val Gln Gly Cys Val
 85 90 95

Leu Thr Gly Ala Trp Val Val Ala His Glu Cys Gly His His Ala Phe
 100 105 110

Ser Asp Tyr Gln Trp Val Asp Asp Thr Val Gly Phe Ile Val His Ser

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115

120

125

Phe Leu Leu Val Pro Tyr Phe Ser Trp Lys Tyr Ser His Arg Arg His
 130 135 140

His Ser Asn Thr Ala Ser Leu Glu Arg Asp Glu Val Phe Val Pro Lys
 145 150 155 160

Pro Arg Ser Lys Leu Pro Trp Tyr Ser Lys Tyr Leu Asn Asn Pro Pro
 165 170 175

Gly Arg Ile Ile Ser Leu Phe Ala Thr Leu Thr Leu Gly Trp Pro Leu
 180 185 190

Tyr Leu Ser Phe Asn Val Ser Gly Arg Pro Tyr Asp Arg Phe Ala Cys
 195 200 205

His Tyr Ala Pro Asn Ser Pro Ile Tyr Asn His Arg Glu Arg Leu Gln
 210 215 220

Ile Trp Leu Ser Asp Val Gly Ile Val Ala Met Ala Phe Val Leu Tyr
 225 230 235 240

Arg Val Ala Leu Val Lys Gly Val Ser Trp Val Val Cys Val Tyr Gly
 245 250 255

Ile Pro Leu Leu Ile Val Asn Gly Phe Leu Val Leu Ile Thr Phe Leu
 260 265 270

Gln His Thr His Pro Ser Leu Pro His Tyr Asp Gly Ser Glu Trp Asp
 275 280 285

Trp Leu Arg Gly Ala Leu Ala Thr Val Asp Arg Asp Tyr Gly Val Leu
 290 295 300

Asn Lys Val Phe His Asn Ile Thr Asp Thr His Val Val His His Leu
 305 310 315 320

Phe Ser Thr Met Pro His Tyr His Ala Met Glu Ala Thr Arg Ala Val

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325

330

335

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<210> 28

<211> 383

<212> PRT

<213> Carthamus tinctorius

<400> 28

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Thr Val Gly Asp Val Lys Lys Ala Ile Pro Pro His Cys Phe Asn Arg
 35 40 45

Ser Val Ile Arg Ser Phe Ser Tyr Val Val Tyr Asp Leu Thr Ile Ala
 50 55 60

Ser Ile Leu Tyr Tyr Ile Ala Thr Thr Phe Ile Pro Leu Leu Pro His
 65 70 75 80

Pro Leu Ala Tyr Val Ala Trp Pro Ile Tyr Trp Ala Val Gln Gly Cys
 85 90 95

Val Met Thr Gly Val Trp Val Ile Ala His Glu Cys Gly His His Ala
 100 105 110

Phe Ser Asp Tyr Gln Trp Leu Asp Asp Thr Val Gly Leu Ile Leu His
 115 120 125

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Ser Val Leu Leu Val Pro Tyr Phe Ser Trp Lys Tyr Ser His Arg Arg
130 135 140

His His Ser Asn Thr Gly Ser Ile Glu His Asp Glu Val Phe Val Pro
145 150 155 160

Lys Leu Lys Ser Gly Val Arg Ser Thr Ala Lys Tyr Leu Asn Asn Pro
165 170 175

Pro Gly Arg Ile Leu Thr Leu Leu Val Thr Leu Thr Leu Gly Trp Pro
180 185 190

Leu Tyr Leu Met Phe Asn Val Ser Gly Arg Tyr Tyr Asp Arg Phe Ala
195 200 205

Cys His Phe Asp Pro Asn Ser Pro Ile Tyr Ser Asn Arg Glu Arg Ala
210 215 220

Gln Ile Phe Ile Ser Asp Ala Gly Ile Phe Ala Val Leu Tyr Gly Leu
225 230 235 240

Tyr Arg Leu Ala Ala Val Lys Gly Leu Val Trp Val Leu Thr Val Tyr
245 250 255

Ala Gly Pro Leu Leu Val Val Asn Gly Phe Leu Val Leu Ile Thr Phe
260 265 270

Leu Gln His Thr His Pro Ser Leu Pro His Tyr Asp Ser Thr Glu Trp
275 280 285

Asp Trp Leu Arg Gly Ala Leu Ala Thr Ile Asp Arg Asp Tyr Gly Ile
290 295 300

Leu Asn Lys Val Phe His Asn Ile Thr Asp Thr His Val Thr His His
305 310 315 320

Leu Phe Ser Thr Met Pro His Tyr His Ala Met Glu Ala Thr Lys Ala
325 330 335

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

Phe Lys Ala Met Tyr Arg Glu Thr Lys Glu Cys Ile Tyr Val Asp Lys
 355 360 365

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<210> 29

<211> 381

<212> PRT

<213> Carthamus tinctorius

<400> 29

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Ser Asp Leu Lys Lys Ala Val Pro Pro His Cys Phe Lys Arg Ser Leu
 35 40 45

Val Arg Ser Phe Ala Ala Leu Phe Arg Asp Ile Ile Ile Val Thr Ala
 50 55 60

Leu Tyr Tyr Leu Ala Ala Thr Ile Ile Pro Val Leu Pro Lys Pro Leu
 65 70 75 80

Thr Tyr Val Ala Trp Pro Leu Tyr Trp Phe Phe Gln Gly Ala Tyr Leu
 85 90 95

Met Gly Leu Trp Val Ile Gly His Glu Cys Gly His His Gly Phe Ser
 100 105 110

Glu Tyr Gln Trp Leu Asp Asp Thr Val Gly Phe Ile Val His Ser Leu
 115 120 125

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Ile Leu Thr Pro Tyr Phe Gly Phe Lys Tyr Ser His Arg Thr His His
130 135 140

Ala Asn Thr Asn Ser Ile Glu Tyr Asp Glu Val Trp Ile Pro Lys Arg
145 150 155 160

Lys Ser Asp Lys Leu Tyr Ser Glu Ile Leu Asn Asn Pro Leu Gly Ser
165 170 175

Phe Val Val Phe Val Phe Lys Ile Val Leu Gly Phe Pro Leu Tyr Phe
180 185 190

Val Phe Asn Leu Tyr Gly Arg Lys Tyr Glu Lys Gly Ile Thr Ser His
195 200 205

Phe Tyr Pro Tyr Ser Pro Ile Phe Asn Asp Ser Glu Arg Phe Gln Ile
210 215 220

Phe Leu Thr Asp Leu Gly Val Phe Gly Thr Leu Tyr Gly Val Tyr Arg
225 230 235 240

Leu Ala Leu Ile Lys Gly Thr Glu Trp Val Ile Asn Phe Tyr Gly Met
245 250 255

Pro Ile Leu Phe Met Ser Gly Phe Phe Ile Leu Leu Thr Tyr Leu His
260 265 270

His Thr His Pro Ser Ile Pro His Tyr Asp Ser Thr Glu Trp Asp Trp
275 280 285

Leu Arg Gly Ala Leu Ala Thr Val Asp Arg Asn Phe Gly Phe Leu Asn
290 295 300

His Ala Phe His Asp Val Thr Arg Thr His Ala Val His His Leu Phe
305 310 315 320

Pro Thr Ile Pro His Tyr His Thr Phe Glu Ala Arg Gln Ala Val Met
325 330 335

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Pro Ile Leu Gly Asp Tyr Tyr Lys Tyr Asp Asp Thr Pro Ile Leu Glu
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Ala Val Trp Arg Glu Thr Lys Asp Cys Ile Phe Ile Glu Pro Glu Glu
355 360 365

Val Asn Gly Glu Lys Lys Gly Ile Tyr Trp Phe Tyr Lys
370 375 380

<210> 30

<211> 380

<212> PRT

<213> Carthamus tinctorius

<400> 30

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Asp Leu Lys Lys Ala Val Pro Pro His Cys Phe Lys Arg Ser Leu Val
35 40 45

Arg Ser Phe Ala Ala Leu Phe Arg Asp Ile Ile Ile Val Ser Ala Leu
50 55 60

Tyr Tyr Leu Ala Ala Thr Val Ile Pro Val Leu Pro Lys Pro Leu Thr
65 70 75 80

Tyr Val Ala Trp Pro Leu Tyr Trp Phe Phe Gln Gly Ala Tyr Leu Met
85 90 95

Gly Leu Trp Val Ile Gly His Glu Cys Gly His His Gly Phe Ser Glu
100 105 110

Tyr Gln Trp Leu Asp Asp Thr Val Gly Phe Ile Val His Ser Leu Ile
115 120 125

pctau2013000426-seq1

Leu Thr Pro Tyr Phe Gly Phe Lys Tyr Ser His Arg Thr His His Ala
130 135 140

Asn Thr Asn Ser Ile Glu Tyr Asp Glu Val Trp Ile Pro Lys Arg Lys
145 150 155 160

Ser Asp Lys Leu Tyr Ser Glu Ile Leu Asn Asn Pro Leu Gly Ser Phe
165 170 175

Val Val Phe Val Phe Lys Ile Val Leu Gly Phe Pro Leu Tyr Phe Val
180 185 190

Phe Asn Leu Tyr Gly Arg Lys Tyr Glu Lys Gly Ile Thr Ser His Phe
195 200 205

Tyr Pro Tyr Ser Pro Ile Phe Asn Asp Ser Glu Arg Phe Gln Ile Phe
210 215 220

Leu Thr Asp Leu Gly Val Phe Gly Thr Leu Tyr Gly Val Tyr Arg Leu
225 230 235 240

Ala Leu Ile Lys Gly Thr Glu Trp Val Ile Asn Phe Tyr Gly Met Pro
245 250 255

Ile Leu Phe Met Ser Gly Phe Phe Ile Leu Leu Thr Tyr Leu His His
260 265 270

Thr His Pro Ser Ile Pro His Tyr Asp Ser Thr Glu Trp Asp Trp Leu
275 280 285

Arg Gly Ala Leu Ala Thr Val Asp Arg Asn Phe Gly Phe Leu Asn His
290 295 300

Ala Phe His Asp Val Thr Arg Thr His Ala Val His His Leu Phe Pro
305 310 315 320

Thr Ile Pro His Tyr His Thr Phe Glu Ala Arg Gln Ala Val Met Pro
325 330 335

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Ile Leu Gly Asp Tyr Tyr Lys Tyr Asp Asp Thr Pro Ile Leu Glu Ala
340 345 350

Val Trp Arg Glu Thr Lys Asp Cys Ile Phe Ile Glu Pro Glu Glu Val
355 360 365

Asn Gly Glu Lys Lys Gly Ile Tyr Trp Phe Tyr Lys
370 375 380

<210> 31

<211> 375

<212> PRT

<213> Carthamus tinctorius

<400> 31

Met Gly Ala Gly Gly Arg Met Asn Asp Asp Ala Thr Arg Glu Arg Asp
1 5 10 15

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

Leu Lys Lys Ala Ile Pro Pro His Cys Phe Lys Arg Ser Leu Thr Thr
35 40 45

Ser Phe Tyr Tyr Arg Phe Arg Asp Leu Gly Leu Ile Tyr Ala Phe Tyr
50 55 60

Tyr Ile Ala Thr Lys Tyr Ile Thr His Leu Pro Gln Pro Tyr Ser Phe
65 70 75 80

Val Ala Trp Pro Leu Tyr Trp Ile Ala Gln Gly Ala Ile Cys Met Gly
85 90 95

Leu Trp Asn Ile Val His Asp Cys Gly His His Cys Phe Ser Asp Tyr
100 105 110

Gln Trp Leu Asp Asp Thr Ile Gly Phe Ile Cys His Ser Phe Leu Leu
115 120 125

Thr Pro Tyr Phe Ser Phe Lys Tyr Ser His Arg Thr His His Ala Asn

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130

135

140

Thr Ser Ser Leu Glu Arg Asp Glu Val Trp Val Pro Lys Arg Lys His
 145 150 155 160

Asp Thr Trp Phe Tyr Glu Val Leu Ser Asn Pro Val Gly Ser Phe Ile
 165 170 175

Met Leu Val Phe Arg Leu Phe Phe Gly Phe Pro Leu Tyr Phe Met Phe
 180 185 190

Asn Leu His Gly Arg Ile Tyr Lys Gly Phe Pro Ser His Phe Asn Pro
 195 200 205

Leu Gly Pro Ile Phe Asn Asp Arg Glu Arg Ala Asn Ile Trp Leu Ser
 210 215 220

Asp Ala Gly Val Leu Thr Val Val Tyr Ala Leu Tyr Arg Ile Gly Ala
 225 230 235 240

Lys Glu Gly Leu Gln Trp Val Leu Phe Val Tyr Ile Tyr Pro Leu Met
 245 250 255

Ala Met Ser Ala Phe Phe Ile Met Phe Thr Tyr Leu His His Thr His
 260 265 270

Pro Ser Ile Ala His Tyr Asp Ser Ser Glu Trp Asp Trp Leu Arg Gly
 275 280 285

Ala Leu Ser Thr Val Asp Arg Asp Tyr Gly Ile Leu Asn Asn Ile Phe
 290 295 300

His Asp Val Thr Ser Ala His Val Val His His Leu Phe Ser Ser Ile
 305 310 315 320

Pro His Tyr Asn Thr Val Glu Ala Thr Gln Tyr Ile Lys Pro Ile Leu
 325 330 335

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

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340

345

350

Arg Asp Thr Lys Glu Cys Leu Phe Ile Glu Glu Asp Pro Glu Lys Lys
 355 360 365

Gly Val Tyr Trp Phe His Lys
 370 375

<210> 32

<211> 376

<212> PRT

<213> Carthamus tinctorius

<400> 32

Met Gly Ala Gly Gly Arg Met Asn Asp Ala Thr Thr Asp Lys Asp Val
 1 5 10 15

Leu Lys Arg Val Pro Thr Ala Lys Thr Pro Phe Glu Ile Ser Asp Leu
 20 25 30

Lys Lys Ala Ile Pro Pro His Cys Phe Lys Arg Ser Leu Thr Thr Ser
 35 40 45

Phe Tyr Tyr Leu Phe Arg Asp Ile Cys Ile Cys Tyr Thr Trp Tyr His
 50 55 60

Leu Gly Ser Asn Tyr Leu Pro Leu Leu Pro Lys Pro Leu Ala Tyr Ile
 65 70 75 80

Ala Trp Pro Ile Tyr Trp Phe Cys Gln Gly Ser Ser Phe Met Gly Ile
 85 90 95

Trp Ser Ile Gly His Asp Leu Gly His His Ala Phe Ser Glu Tyr Gln
 100 105 110

Trp Leu Asp Asp Ala Leu Gly Phe Val Ile His Ser Ala Phe Leu Thr
 115 120 125

Pro Tyr Phe Ser Phe Lys Tyr Ser His Arg Ser His His Ala His Thr
 130 135 140

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Asn Ser Met Glu Tyr Asp Glu Val Trp Ile Pro Lys Arg Lys Ala Asp
145 150 155 160

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

Thr Val Val Arg Leu Leu Phe Ser Phe Pro Met Tyr Phe Thr Phe Asn
180 185 190

Ile His Gly Arg Pro Tyr Asn Gly Phe Val Ser His Phe Tyr Pro Gln
195 200 205

Ser Pro Met Phe Asn Asp Ser Glu Arg Lys Leu Val Trp Leu Ser Asp
210 215 220

Ala Gly Met Val Ala Ala Phe Tyr Gly Leu Tyr Lys Ile Ala Gln Ser
225 230 235 240

Thr Ser Ala Thr Trp Leu Phe Cys Ile Tyr Gly Ala Pro Leu Leu Val
245 250 255

Met Asn Ala His Phe Ile Phe Phe Thr Phe Leu His His Ser His Val
260 265 270

Ser Leu Ala His Tyr Asp Ser Arg Glu Trp Asp Trp Ile Arg Gly Ala
275 280 285

Leu Ser Thr Val Asp Arg Asn Tyr Gly Ile Leu Asn Thr Val Phe His
290 295 300

Asp Val Thr Cys Ala His Val Val His His Leu Ile Ser Thr Ile Pro
305 310 315 320

His Tyr His Thr Val Glu Ala Thr Asn Ala Val Lys Pro Ile Leu Gly
325 330 335

Asp Tyr Tyr Lys Tyr Asp Asp Thr Pro Ile Leu Lys Ala Phe Trp Arg
340 345 350

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Glu Thr Lys Asn Cys Ile Tyr Val Glu Pro Asp Glu Gly Ala Glu Asp
 355 360 365

Ser Gly Val Tyr Trp Phe Arg Arg
 370 375

<210> 33
 <211> 372
 <212> PRT
 <213> Carthamus tinctorius

<400> 33

Met Gly Ala Gly Gly Arg Met Lys Thr Glu Glu Lys Asp Ile Met Lys
 1 5 10 15

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

Ala Thr Pro Pro His Cys Phe Lys Arg Ser Leu Ile Trp Ser Phe Gly
 35 40 45

Ser Phe Phe Arg Asp Leu Ile Val Ile Tyr Ser Phe Tyr Tyr Leu Ala
 50 55 60

Ser Thr Phe Ile Pro Leu Leu Pro Pro Ala Leu Ser Tyr Val Ala Trp
 65 70 75 80

Pro Leu Tyr Trp Phe Ala Gln Gly Ser Ile Leu Met Gly Phe Trp Ile
 85 90 95

Leu Gly His Glu Cys Gly His His Ala Phe Ser Glu Tyr Gln Trp Val
 100 105 110

Asp Asp Ala Val Gly Phe Phe Ile His Ser Val Cys Leu Thr Pro Tyr
 115 120 125

Phe Ser Phe Lys Tyr Ser His Arg Ser His His Ala His Thr Asn Ser
 130 135 140

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Ile Glu Tyr Asp Glu Val Tyr Ile Pro Lys Arg Lys Ala Asp Thr Phe
145 150 155 160

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

Leu Arg Thr Thr Leu Gly Leu Pro Leu Tyr Leu Ile Phe Asn Thr Tyr
180 185 190

Gly Arg Asp Tyr Asn Gly Phe Ala Asn His Phe Leu Pro Gln Ser Gly
195 200 205

Ile Phe Asn Asp Ser Glu Arg Ala Gln Val Val Leu Ser Asp Val Gly
210 215 220

Ile Phe Ala Val Leu Tyr Ala Leu Tyr Arg Leu Val Leu Ile Gln Gly
225 230 235 240

Leu Lys Ser Thr Ile Phe Leu Gln Gly Ile Pro Leu Phe Val Met Ser
245 250 255

Gly Phe Phe Ile Phe Leu Thr Tyr Leu Asn His Thr His Pro Ala Ile
260 265 270

Ala His Tyr Asp Ser Thr Glu Trp Asp Trp Leu Arg Gly Ala Leu Ser
275 280 285

Thr Ile Asp Arg Asp Phe Gly Ile Leu Asn Arg Val Phe His Asn Ala
290 295 300

Asn His Thr His Gly Ile His His Leu Phe Pro Thr Ile Pro His Tyr
305 310 315 320

His Ala Ile Glu Ala Arg Glu Ala Val Lys Pro Ile Leu Gly Asp Tyr
325 330 335

Tyr Met Tyr Asp Asp Thr Pro Ile Leu Lys Ala Met Trp Arg Asp Thr
340 345 350

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Lys Glu Cys Ile Tyr Val Glu Pro Asp Asp Glu Lys Lys Gly Val Tyr
 355 360 365

Trp Tyr Phe Lys
 370

<210> 34
 <211> 382
 <212> PRT
 <213> Carthamus tinctorius
 <400> 34

Met Gly Ser Gly Gly Arg Ala Thr Glu Arg Ser Asn Pro Glu Ser Glu
 1 5 10 15

Val Val Val Lys Arg Ala Pro Ser Ser Lys Pro Pro Phe Thr Leu Gly
 20 25 30

Asp Ile Lys Lys Ala Ile Pro Pro His Cys Phe Glu Arg Ser Leu Ile
 35 40 45

Arg Ser Ser Ser Tyr Leu Phe Leu Asp Leu Phe Leu Ser Ser Leu Phe
 50 55 60

Tyr Tyr Val Ala Ala Val Tyr Ile Pro Arg Leu Pro Ile Ser Leu Ser
 65 70 75 80

Tyr Val Ala Trp Pro Val Tyr Trp Ile Leu Gln Gly Ser Val Gln Met
 85 90 95

Gly Leu Trp Val Ile Gly His Glu Cys Gly His Gln Ala Phe Ser Asp
 100 105 110

Tyr Pro Trp Phe Asn Asp Thr Ile Gly Tyr Leu Leu His Thr Gly Met
 115 120 125

Leu Ala Pro Tyr Phe Ser Trp Lys Tyr Ser His Arg Arg His His Ser
 130 135 140

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Asn Thr Gly Ser Leu Glu Leu Asp Glu Ser Phe Val Pro Lys Lys Lys
145 150 155 160

Ser Ser Leu Asn Ser Val Ala Arg Leu Leu Asn Thr Pro Pro Gly Arg
165 170 175

Leu Phe Arg Leu Thr Ile Leu Cys Thr Val Gly Trp Leu Leu Tyr Ile
180 185 190

Cys Phe Asn Val Ser Gly Arg Lys Tyr Glu Lys Phe Ala Asn His Phe
195 200 205

Asp Pro Lys Ser Pro Ile Tyr Asn Asp Arg Glu Arg Phe Gln Ile Leu
210 215 220

Leu Thr Asp Ile Gly Leu Leu Val Thr Ser Tyr Gly Leu Tyr Lys Leu
225 230 235 240

Ala Leu Ala Gln Gly Phe Ala Trp Leu Ile Thr Ile Tyr Phe Ala Pro
245 250 255

Leu Val Ile Val Tyr Gly Phe Leu Val Val Ile Thr Trp Leu His His
260 265 270

Thr His Arg Ser Leu Pro His Tyr Asp Ser Thr Glu Trp Asn Trp Leu
275 280 285

Arg Gly Ala Leu Ser Thr Met Asp Arg Asp Tyr Gly Val Phe Asn Thr
290 295 300

Val Leu His His Ile Thr Asp Thr His Val Ala His His Leu Phe Phe
305 310 315 320

Thr Ile Pro His Tyr Asn Ala Met Glu Ala Thr Lys Ala Ile Lys Pro
325 330 335

Phe Leu Gly Glu Tyr Tyr Gln Phe Asp Asp Thr Pro Ile Ile Lys Ala
340 345 350

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Met Trp Arg Glu Ala Thr Glu Cys Phe Phe Val Glu Ala Asp Glu Gly
355 360 365

Glu Gly Lys Ser Lys Gly Val Tyr Trp Phe Asn Asn Lys Met
370 375 380

<210> 35

<211> 387

<212> PRT

<213> Carthamus tinctorius

<400> 35

Met Gly Ala Gly Gly Arg Ser Asn Pro Arg Asp Leu Asp Val Lys Lys
1 5 10 15

Phe Asp Thr Val Glu Gly Ile Lys Arg Ala Pro Thr Ser Lys Pro Pro
20 25 30

Phe Thr Leu Gly Asp Ile Lys Lys Ala Ile Pro Pro His Cys Phe Lys
35 40 45

Arg Ser Leu Ile Arg Ser Phe Ser Tyr Leu Val Tyr Asp Leu Thr Ala
50 55 60

Val Ser Ile Phe Tyr Tyr Leu Ala Thr Thr Tyr Ile Pro Gln Leu Pro
65 70 75 80

Tyr Pro Leu Ala Tyr Val Ala Trp Pro Val Tyr Trp Phe Val Gln Gly
85 90 95

Cys Val Phe Met Gly Leu Trp Leu Ile Ala His Glu Cys Gly His His
100 105 110

Ala Phe Ser Asp His Val Trp Leu Glu Asp Ser Ile Gly Phe Val Leu
115 120 125

His Ser Cys Leu Leu Thr Pro Tyr Phe Ser Trp Lys Ile Ser His Arg
130 135 140

Arg His His Ala Asn Thr Gly Ser Leu Glu His Asp Glu Val Tyr Val

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

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355

360

365

Glu Pro Asp Glu Ser Asp Glu Lys Asn Lys Gly Ile Tyr Trp Tyr Arg
 370 375 380

Ser Lys Tyr
 385

<210> 36
 <211> 380
 <212> PRT
 <213> Carthamus tinctorius

<400> 36

Met Gly Gly Gly Gly Cys Ile Pro Ala Ser Lys Thr Glu Ala Gln Gln
 1 5 10 15

Thr Asn His Leu Ser Arg Val Pro Tyr Glu Lys Pro Ala Phe Thr Val
 20 25 30

Gly Asp Ile Lys Arg Val Ile Pro Pro His Cys Phe Gln Arg Ser Leu
 35 40 45

Ile Arg Ser Phe Ser Tyr Val Ala Tyr Asp Leu Ala Ile Ala Phe Leu
 50 55 60

Ser Tyr His Leu Ala Thr Thr Tyr Phe His Arg Leu Ser Pro Pro Leu
 65 70 75 80

Ser Tyr Leu Ala Trp Ser Ala Tyr Trp Ile Val Gln Gly Cys Val Leu
 85 90 95

Thr Gly Val Trp Val Ile Ala His Glu Cys Gly His His Ala Phe Ser
 100 105 110

Asp His Gln Trp Val Asp Asp Thr Val Gly Leu Ile Leu His Ser Ala
 115 120 125

Leu Leu Val Pro Tyr Phe Ser Trp Lys Cys Ser His Arg Arg His His
 130 135 140

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Leu Asn Thr Ala Ser Leu Glu Arg Asp Glu Val Phe Val Pro Lys Pro
145 150 155 160

Lys Ser Lys Ile Pro Trp Tyr Ser Lys Tyr Leu Asn Asn Pro Pro Gly
165 170 175

Arg Leu Ile Ile Val Phe Thr Thr Leu Val Leu Gly Trp Pro Leu Tyr
180 185 190

Leu Ala Phe Asn Val Ser Gly Arg Pro Tyr Asp Arg Phe Ala Cys His
195 200 205

Tyr Ala Pro Asn Ser Pro Ile Phe Thr Asn Arg Glu Arg Leu Gln Ile
210 215 220

Trp Ile Ser Asp Ala Gly Ile Ile Ala Val Ser Tyr Leu Leu Tyr Arg
225 230 235 240

Met Ala Leu Ala Lys Ser Val Ala Trp Val Val Cys Ile Tyr Gly Val
245 250 255

Pro Leu Leu Ile Val Asn Gly Phe Leu Val Met Ile Thr Tyr Leu Gln
260 265 270

His Thr His Pro Ser Leu Pro His Tyr Asp Asp Ser Glu Trp Asp Trp
275 280 285

Leu Arg Gly Ala Leu Ala Thr Val Asp Arg Asp Tyr Gly Leu Leu Asn
290 295 300

Lys Val Phe His Asn Ile Thr Asp Thr His Val Val His His Leu Phe
305 310 315 320

Ser Thr Met Pro His Tyr His Ala Met Glu Ala Thr Lys Ala Val Glu
325 330 335

Pro Val Leu Gly Gly Tyr Tyr Arg Phe Asp Asp Thr Pro Phe Tyr Val
340 345 350

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Ala Met Trp Arg Glu Ala Lys Glu Cys Leu Tyr Val Glu Thr Asp Glu
355 360 365

Lys Lys Gly Gly Val Phe Trp Tyr Lys Asn Lys Tyr
370 375 380

<210> 37

<211> 379

<212> PRT

<213> Carthamus tinctorius

<400> 37

Met Gly Ala Gly Gly Arg Met Ser Asp Ser Ser Glu Ser Ser Thr Asp
1 5 10 15

Ile Leu Lys Arg Val Pro Ile Asp Pro Pro Phe Thr Leu Ser Asp Leu
20 25 30

Lys Lys Ala Ile Pro Ala Arg Cys Phe Glu Arg Ser Leu Ile Arg Ser
35 40 45

Ser Tyr Tyr Val Val His Asp Leu Val Val Ala Tyr Val Phe Tyr Tyr
50 55 60

Leu Ala Asp Thr Tyr Ile Pro Gln Leu Pro Thr Pro Leu Ala Tyr Leu
65 70 75 80

Ala Trp Pro Ile Tyr Trp Phe Cys Gln Ala Ser Ile Cys Thr Gly Leu
85 90 95

Trp Val Ile Gly His Glu Cys Gly His His Ala Phe Ser Glu Gln Gln
100 105 110

Trp Ile Gly Asp Ile Val Gly Ile Val Leu His Ser Ala Leu Phe Thr
115 120 125

Pro Tyr Phe Ala Trp Lys Tyr Ser His Arg Asn His His Ala Asn Thr
130 135 140

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Asn Ser Leu Asp Asn Asp Glu Val Tyr Ile Pro Lys Arg Lys Ser Lys
145 150 155 160

Val Ala Ile Tyr Ser Lys Leu Leu Asn Asn Pro Pro Gly Arg Val Phe
165 170 175

Thr Leu Val Phe Arg Leu Thr Leu Gly Phe Pro Leu Tyr Leu Leu Thr
180 185 190

Asn Ile Ser Gly Lys Lys Tyr Gly Arg Phe Ala Asn His Phe Asp Pro
195 200 205

Met Ser Pro Ile Phe Thr Glu Arg Glu Arg Ile Gln Val Leu Val Ser
210 215 220

Asp Leu Gly Ile Leu Ala Val Leu Tyr Ala Ile Lys Leu Ala Val Ala
225 230 235 240

Ala Lys Gly Ala Ala Trp Val Ile Ala Met Tyr Gly Ile Pro Val Val
245 250 255

Gly Val His Val Phe Phe Val Leu Ile Thr Tyr Leu His His Thr His
260 265 270

Leu Ser Leu Pro His Tyr Asp Ser Thr Glu Trp Asp Trp Ile Arg Gly
275 280 285

Ala Leu Ser Thr Ile Asp Arg Asp Phe Gly Phe Leu Asn Arg Val Phe
290 295 300

His Asp Val Thr His Thr His Val Leu His His Leu Ile Ser Tyr Ile
305 310 315 320

Pro His Tyr His Ala Lys Glu Ala Arg Asp Ala Ile Lys Pro Ile Leu
325 330 335

Gly Glu Tyr Tyr Lys Ile Asp Arg Thr Pro Ile Phe Lys Ala Met Trp
340 345 350

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Arg Glu Ala Lys Glu Ser Ile Tyr Ile Glu Pro Asp Glu Asn Ser Glu
355 360 365

His Lys Gly Thr Tyr Trp Tyr His Lys Glu Leu
370 375

<210> 38
<211> 244
<212> PRT
<213> Carthamus tinctorius

<400> 38

Met Gly Gly Gly Gly Cys Met Ser Ala Ser Glu Thr Lys Ala Glu Glu
1 5 10 15

Lys Lys Asn Pro Leu Asp Arg Val Pro Cys Ala Lys Pro Pro Phe Thr
20 25 30

Ile Ser Asp Ile Lys Gln Ala Ile Pro Ser His Cys Phe Asn Arg Ser
35 40 45

Leu Ile Arg Ser Phe Ser Tyr Ile Val Tyr Asp Leu Ala Ile Ala Phe
50 55 60

Val Leu Tyr Tyr Leu Ala Thr Thr Tyr Ile His Arg Leu Pro Thr Pro
65 70 75 80

Phe Ser Tyr Leu Ala Trp Leu Ala Tyr Trp Ile Val Gln Gly Cys Val
85 90 95

Leu Thr Gly Ala Trp Val Val Ala His Glu Cys Gly His His Ala Phe
100 105 110

Ser Asp Tyr Gln Trp Val Asp Asp Thr Val Gly Phe Ile Val His Ser
115 120 125

Phe Leu Leu Val Pro Tyr Phe Ser Trp Lys Tyr Ser His Arg Arg His
130 135 140

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His Ser Asn Thr Ala Ser Leu Glu Arg Asp Glu Val Phe Val Pro Lys
145 150 155 160

Pro Arg Ser Lys Leu Pro Trp Tyr Ser Lys Tyr Leu Asn Asn Pro Pro
165 170 175

Gly Arg Ile Ile Ser Leu Phe Ala Thr Leu Thr Leu Gly Trp Pro Leu
180 185 190

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

Thr Met Leu Pro Thr Ala Arg Phe Thr Thr Ile Ala Asn Ala Ser Arg
210 215 220

Phe Gly Ser Leu Thr Trp Gly Ser Trp Pro Cys Arg Ser Ser Phe Thr
225 230 235 240

Val Leu Arg Trp

<210> 39

<211> 501

<212> DNA

<213> Carthamus tinctorius

<400> 39

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cggttatacg ttgaagctgg acatgacatc gcagagatca ttggagacta gaggcgcc 180

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atggatgatg ctggattgga aaacaaagcg gcctgacatg ctcgctgatc tagaatcctt 360

ttggtctaag aagaattgtg cttgatgggc ttgtattccg ccaaaccctt tctattatat 420

cccatgaaat atgggctgat cgaactggat cgtagagac agctaataatgc tcatattgcaa 480

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<210> 40
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 <212> DNA
 <213> Carthamus tinctorius

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 taaagtgcac tgagccgagg agtccgctat tccgagcctg tttagaagtg actacttaac 180
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 tggtttaggg agaattgtgg aggatagttt catatttcgt caaaactttt ctattaggtc 660
 gtatgaaata gg 672

<210> 41
 <211> 1671
 <212> DNA
 <213> Carthamus tinctorius

<400> 41
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 tagggatata tgctgttctt tggatcatctt tgaacaatta ttataattt ggtgagcacg 180
 tctgaaacca ataggtttga ctgataaaca tacgggttaa tctgaatact ttaatcatgg 240
 ttgctacggc tgctactgca tcaactgtttc cggtttcttc tccacaacct cactctggga 300
 ccaagaaatc tggtgaagctt ggagggtgtc cagatggcgt tgatgtgcgt ggaatcaaga 360
 caaaatctgt tacttctggc ggtttgcaag ttaaggctgc acaggctcct gcagaggtaa 420

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tcttggctgc agagaaacaa tggatgatgc tggattggaa aaccaagcgg cctgacatgc	600
ttgctgatct ggatcctttt ggtttaggga gaattgtgca ggatgggctt gtattccgtc	660
aaaactttctc tattagatcc tatgaaatag gggctgatcg aactgcgtcg atagagacgc	720
taatgaatca tttgcaggaa actgccctta atcatgtaaa gactgcggga ctcttgggtg	780
atggcttttg ctcaacacct gaaatgtgca agaagaatct attctgggtg gtgacaaaga	840
tgcaggtgat ggtagaccgt tatccaactt ggggtgatgt tgttcaagta gatacatggg	900
tagctcgatc tgggaaaaac ggcatgcgcc gtgattggct gcttcgtgat tgcaaaacag	960
gcgaggctcgt aacaagagct tcaagtaatt gggttatgat gaataaagag acaaggaggt	1020
tatcaaaaat tccagatgaa gtccgagctg aaatagaaca gtactttgta gatgcacctc	1080
cggctcgtgga tgatgacagc agaaaattgc ctaaacttga agacaccact gctgactatg	1140
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tgaagtatat tggttggatc cttgagagtg ctccacaaca agttgtggag aagtatgagc	1260
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gacatcggta ttgggtggca atggtgatgg aatagctgat tccgattcca gtgatgttga	1380
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tggaaatgga aatggaaatg gaagtgccta ataccatgtt tcatgttttg cccttttgcc	1560
tcatttcaat gtgtataaaa gaatcatcat cactcatcct atttatgctg gctcttggaa	1620
ataacttgca atgtcctgcc cccacatata tacatatattt tctattttgt a	1671

<210> 42

<211> 458

<212> DNA

<213> Carthamus tinctorius

<400> 42

atggtggata ctgctgctac tgcttcgctg tttccggttt cttctacaca atcggactct	60
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ggtgctaaga actccggtaa gcatggaggt gggctgggaa gtgtggatgt gcgcgggatt	120
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pctau2013000426-seq1

aagacaaaat cttctgggag tttgcaagtt aagacacatg cgcaggcccc cgcaaagggtg	180
aatggttcta gaataggtgt catggatggc ctcaagatgg atgataattc gtcgtcggct	240
gccccgagga cttttatcaa ccaattgcct gattggagca tgcttcttgc tgccatcacg	300
actattttct tggctgctga gaagcaatgg atgatgctag agtggaagac taagcggccg	360
gacatgcttt cggaaatgga tccttttgggt ttagggagaa ttgtggagga tagtttcata	420
tttcgtcaaa acttttctat taggtcgtat gaaatagg	458

<210> 43
 <211> 1086
 <212> DNA
 <213> Carthamus tinctorius

<400> 43 atggttgcta cggctgctac tgcatcactg tttccggttt cttctccaca acctcactct	60
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aagacaaaat ctgttacttc tggcgggtttg caagttaagg ctgcacaggc tcctgcagag	180
gtaaattggga ctagagtgcg gcccatgatac aagacagacg ataattctac gtcacatgtc	240
ccaagaacct ttatcaacca gttgccgatg tggagcatgc ttcttgctgc aatcaccaca	300
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aggttatcaa aaattccaga tgaagtccga gctgaaatag aacagtactt tgtagatgca	840
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cgctga 1086

<210> 44
<211> 152
<212> PRT
<213> Carthamus tinctorius

<400> 44

Met Val Asp Thr Ala Ala Thr Ala Ser Leu Phe Pro Val Ser Ser Thr
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Gly Ser Val Asp Val Arg Gly Ile Lys Thr Lys Ser Ser Gly Ser Leu
35 40 45

Gln Val Lys Thr His Ala Gln Ala Pro Ala Lys Val Asn Gly Ser Arg
50 55 60

Ile Gly Val Met Asp Gly Leu Lys Met Asp Asp Asn Ser Ser Ser Ala
65 70 75 80

Ala Pro Arg Thr Phe Ile Asn Gln Leu Pro Asp Trp Ser Met Leu Leu
85 90 95

Ala Ala Ile Thr Thr Ile Phe Leu Ala Ala Glu Lys Gln Trp Met Met
100 105 110

Leu Glu Trp Lys Thr Lys Arg Pro Asp Met Leu Ser Glu Met Asp Pro
115 120 125

Phe Gly Leu Gly Arg Ile Val Glu Asp Ser Phe Ile Phe Arg Gln Asn
130 135 140

Phe Ser Ile Arg Ser Tyr Glu Ile
145 150

pctau2013000426-seq1

<210> 45
 <211> 361
 <212> PRT
 <213> Carthamus tinctorius

<400> 45

Met Val Ala Thr Ala Ala Thr Ala Ser Leu Phe Pro Val Ser Ser Pro
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Gln Pro His Ser Gly Thr Lys Lys Ser Gly Lys Leu Gly Gly Val Pro
 20 25 30

Asp Gly Val Asp Val Arg Gly Ile Lys Thr Lys Ser Val Thr Ser Gly
 35 40 45

Gly Leu Gln Val Lys Ala Ala Gln Ala Pro Ala Glu Val Asn Gly Thr
 50 55 60

Arg Val Arg Pro Met Ile Lys Thr Asp Asp Asn Ser Thr Ser His Val
 65 70 75 80

Pro Arg Thr Phe Ile Asn Gln Leu Pro Asp Trp Ser Met Leu Leu Ala
 85 90 95

Ala Ile Thr Thr Ile Phe Leu Ala Ala Glu Lys Gln Trp Met Met Leu
 100 105 110

Asp Trp Lys Thr Lys Arg Pro Asp Met Leu Ala Asp Leu Asp Pro Phe
 115 120 125

Gly Leu Gly Arg Ile Val Gln Asp Gly Leu Val Phe Arg Gln Asn Phe
 130 135 140

Ser Ile Arg Ser Tyr Glu Ile Gly Ala Asp Arg Thr Ala Ser Ile Glu
 145 150 155 160

Thr Leu Met Asn His Leu Gln Glu Thr Ala Leu Asn His Val Lys Thr
 165 170 175

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Ala Gly Leu Leu Gly Asp Gly Phe Gly Ser Thr Pro Glu Met Cys Lys
180 185 190

Lys Asn Leu Phe Trp Val Val Thr Lys Met Gln Val Met Val Asp Arg
195 200 205

Tyr Pro Thr Trp Gly Asp Val Val Gln Val Asp Thr Trp Val Ala Arg
210 215 220

Ser Gly Lys Asn Gly Met Arg Arg Asp Trp Leu Leu Arg Asp Cys Lys
225 230 235 240

Thr Gly Glu Val Val Thr Arg Ala Ser Ser Asn Trp Val Met Met Asn
245 250 255

Lys Glu Thr Arg Arg Leu Ser Lys Ile Pro Asp Glu Val Arg Ala Glu
260 265 270

Ile Glu Gln Tyr Phe Val Asp Ala Pro Pro Val Val Asp Asp Asp Ser
275 280 285

Arg Lys Leu Pro Lys Leu Glu Asp Thr Thr Ala Asp Tyr Val Arg Asn
290 295 300

Gly Leu Thr Pro Arg Trp Ser Asp Leu Asp Val Asn Gln His Val Asn
305 310 315 320

Asn Val Lys Tyr Ile Gly Trp Ile Leu Glu Ser Ala Pro Gln Gln Val
325 330 335

Val Glu Lys Tyr Glu Leu Ala Gly Leu Thr Leu Glu Tyr Arg Arg Glu
340 345 350

Cys Arg Lys Asp Ser Val Leu Ser Arg
355 360

<210> 46
<211> 1545
<212> DNA

<213> Carthamus tinctorius

<400> 46

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cttctccttc caatggcttg cagactcgca gattctagtt tccttttgaa ggggtcccaa	180
caaaagccat tgcatgggta tagatttggg tcactctatc cagcaggcac atcttttttg	240
aagtgggata ttctacctaa atgtagaacc aaacatcaaa catatgtagt tcctttgaga	300
aggactaaaa tagtacaagc agtgactagt tctgttacag caccattacc atcagacagt	360
gcagaagaga ggaaagaatt atgtgaaagt tacggtttcc ggcaaattgg agaaccactc	420
ccggacaata tcaccttgaa gaacattatc gatactcttc ccaaaactgt gtttgagatt	480
gataacgtga aagcattgaa gtcgggtattg atatctgcaa cttcatatgc tttggggcctt	540
ttcatgattg ccaaactctc atggtatctt cttccattgg cttgggcatg gacaggaact	600
gcagttacag ggttctttgt aatagggtcat gattgtgcac acaaactctt ctcaaagaac	660
aaactgggtg aagatattgt tggaactttg gccttcctgc cattgatata cccttatgag	720
ccatggcggt tcaagcatga tcgacatcat gcaaaaacaa acatgttgga tgaagataca	780
gcttggcacc ctgtaatgga aacacatttc aaggagaacc caattttcca gaaggcaatc	840
atattcggat atggctctat tcgccccatc atgtctatat cgcactgggtt aatctggcat	900
ttcaatttga ataaattcag accgaatgaa attggaagag taaagatcag tcttgcttgt	960
gtttttgcat tcatggcaat tggatggccg ttaattgtct acaaggccgg gatagttgga	1020
tggataaagt tttggttaat gccatggttg ggctatcatt tttggatgag cactttcaca	1080
atggttcacc acacagcacc tcacgtacct ttcaaatttt cggacgagtg gaatgcagct	1140
aaggcacaac ttagtggcac cgtgcactgt gattatcctc gctggataga gatcctttgt	1200
catgatatca acgttcatat cccccacat gtctcctcaa agattccaag ttacaacttg	1260
cgtgcagctc ataaatctct tcaagagaat tggggaaaat atatgaatga ggcctcatgg	1320
aactggcgct taatgaagac gatcttgacg atttgccatg tctacgacaa agagcgtaat	1380
tacatctcgt ttgaagagat tgctcccgag atatcccagc ccaatcgcac tacttagaag	1440
ggtaatgccc gactatgctt aactcaatca tttgtttttt tatttacata tttcattaat	1500

pctau2013000426-seq1

tgttaatgct atatatatttc ctttatatac aaaaaaaagtt acacc

1545

<210> 47

<211> 1305

<212> DNA

<213> Carthamus tinctorius

<400> 47

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ctacctaaat gtagaaccaa acatcaaaca tatgtagttc ctttgagaag gactaaaata 180

gtacaagcag tgactagttc tgttacagca ccattaccat cagacagtgc agaagagagg 240

aaagaattat gtgaaagtta cggtttccgg caaattggag aaccactccc ggacaatatc 300

accttgaaga acattatcga tactcttccc aaaactgtgt ttgagattga taacgtgaaa 360

gcattgaagt cggtattgat atctgcaact tcatatgctt tggggctttt catgattgcc 420

aaatctccat ggtatcttct tccattggct tgggcatgga caggaactgc agttacaggg 480

ttctttgtaa taggtcatga ttgtgcacac aaatctttct caaagaacaa actggtggaa 540

gatattgttg gaactttggc cttcctgcca ttgatatacc cttatgagcc atggcgtttc 600

aagcatgatc gacatcatgc aaaaacaaac atgttggatg aagatacagc ttggcaccct 660

gtaatggaaa cacatttcaa ggagaacca attttccaga aggcaatcat attcggatat 720

ggtcctattc gcccatcat gtctatatcg cactgggtaa tctggcattt caatttgaat 780

aaattcagac cgaatgaaat tggaagagta aagatcagtc ttgcttgtgt ttttgcattc 840

atggcaattg gatggccgtt aattgtctac aaggccggga tagttggatg gataaagttt 900

tggttaatgc catggttggg ctatcatttt tggatgagca ctttcacaat ggttcaccac 960

acagcacctc acgtaccttt caaatatttcg gacgagtgga atgcagctaa ggcacaactt 1020

agtggcaccg tgcactgtga ttatcctcgc tggatagaga tcctttgtca tgatatcaac 1080

gttcatatcc cccaccatgt ctctcaaag attccaagtt acaacttgcg tgcagctcat 1140

aaatctcttc aagagaattg gggaaaatat atgaatgagg cctcatggaa ctggcgctta 1200

atgaagacga tcttgacgat ttgcatgtc tacgacaaag agcgtaatta catctcgttt 1260

gaagagattg ctcccgagat atcccagccc aatcgcata cttag

1305

<210> 48

<211> 434

<212> PRT

<213> Carthamus tinctorius

<400> 48

Met Ala Cys Arg Leu Ala Asp Ser Ser Phe Leu Leu Lys Gly Pro Gln
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Gln Lys Pro Leu His Gly Tyr Arg Phe Gly Ser Leu Tyr Pro Ala Gly
 20 25 30

Thr Ser Phe Leu Lys Trp Asp Ile Leu Pro Lys Cys Arg Thr Lys His
 35 40 45

Gln Thr Tyr Val Val Pro Leu Arg Arg Thr Lys Ile Val Gln Ala Val
 50 55 60

Thr Ser Ser Val Thr Ala Pro Leu Pro Ser Asp Ser Ala Glu Glu Arg
 65 70 75 80

Lys Glu Leu Cys Glu Ser Tyr Gly Phe Arg Gln Ile Gly Glu Pro Leu
 85 90 95

Pro Asp Asn Ile Thr Leu Lys Asn Ile Ile Asp Thr Leu Pro Lys Thr
 100 105 110

Val Phe Glu Ile Asp Asn Val Lys Ala Leu Lys Ser Val Leu Ile Ser
 115 120 125

Ala Thr Ser Tyr Ala Leu Gly Leu Phe Met Ile Ala Lys Ser Pro Trp
 130 135 140

Tyr Leu Leu Pro Leu Ala Trp Ala Trp Thr Gly Thr Ala Val Thr Gly
 145 150 155 160

Phe Phe Val Ile Gly His Asp Cys Ala His Lys Ser Phe Ser Lys Asn
 165 170 175

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Lys Leu Val Glu Asp Ile Val Gly Thr Leu Ala Phe Leu Pro Leu Ile
180 185 190

Tyr Pro Tyr Glu Pro Trp Arg Phe Lys His Asp Arg His His Ala Lys
195 200 205

Thr Asn Met Leu Asp Glu Asp Thr Ala Trp His Pro Val Met Glu Thr
210 215 220

His Phe Lys Glu Asn Pro Ile Phe Gln Lys Ala Ile Ile Phe Gly Tyr
225 230 235 240

Gly Pro Ile Arg Pro Ile Met Ser Ile Ser His Trp Leu Ile Trp His
245 250 255

Phe Asn Leu Asn Lys Phe Arg Pro Asn Glu Ile Gly Arg Val Lys Ile
260 265 270

Ser Leu Ala Cys Val Phe Ala Phe Met Ala Ile Gly Trp Pro Leu Ile
275 280 285

Val Tyr Lys Ala Gly Ile Val Gly Trp Ile Lys Phe Trp Leu Met Pro
290 295 300

Trp Leu Gly Tyr His Phe Trp Met Ser Thr Phe Thr Met Val His His
305 310 315 320

Thr Ala Pro His Val Pro Phe Lys Phe Ser Asp Glu Trp Asn Ala Ala
325 330 335

Lys Ala Gln Leu Ser Gly Thr Val His Cys Asp Tyr Pro Arg Trp Ile
340 345 350

Glu Ile Leu Cys His Asp Ile Asn Val His Ile Pro His His Val Ser
355 360 365

Ser Lys Ile Pro Ser Tyr Asn Leu Arg Ala Ala His Lys Ser Leu Gln
370 375 380

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Glu Asn Trp Gly Lys Tyr Met Asn Glu Ala Ser Trp Asn Trp Arg Leu
385 390 395 400

Met Lys Thr Ile Leu Thr Ile Cys His Val Tyr Asp Lys Glu Arg Asn
405 410 415

Tyr Ile Ser Phe Glu Glu Ile Ala Pro Glu Ile Ser Gln Pro Asn Arg
420 425 430

Ile Thr

<210> 49
<211> 756
<212> DNA
<213> Artificial Sequence

<220>
<223> RNAi vector construction

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gaggtcttcg tcccgaact caaatccggg gtccgggtcca ccgcaaaata cctaaacaac 180
ccccccggcc ggatcttgac ctttcttgtc accctcacc tcggctggcc gttgtacctc 240
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cccatctact cgaaccgtga acgtgcccag atcttcatct ccgacgccgg gatcttcgcc 360
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tatgccggac cgttgctcgt ggtcaacggg tttcttgtcc tgatcacgtt cctccagcac 480
accacccgt cgttgccga ctacgactca accgagtggg actggctccg tggggccctg 540
gccaccatcg accgtgacta cgggatttta aacaaggtgt tccacaacat caccgacacc 600
cacgtgacc accatctgtt ttcgacgat ccgcattatc acgcgatgga ggccacgaag 660
gcgataattc cgatcctcgg ggattattat cagttcgatg ggacgtcagt ttttaaggcg 720
atgtataggg agacgaagga gtgcatttat gtggat 756

<210> 50
 <211> 300
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> RNAi vector construction

<400> 50
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 ggctgcagag aaacaatgga tgatgctgga ttggaaaacc aagcggcctg acatgcttgc 120
 tgatctggat ccttttggtt tagggagaat tgtgcaggat gggcttgtat tccgtcaaaa 180
 cttctctatt agatcctatg aaataggggc tgatcgaact gcgtcgatag agacgctaata 240
 gaatcatttg caggaaactg cccttaatca tgtaaagact gcgggactct tgggtgatgg 300

<210> 51
 <211> 290
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> RNAi vector construction

<400> 51
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 cttcatatgc tttggggcctt ttcattgattg ccaaattctc atggtatctt cttccattgg 120
 cttgggcatg gacaggaact gcagttacag ggttctttgt aataggtcat gattgtgcac 180
 acaaattctt ctcaaagaac aaactggtgg aagatattgt tggaactttg gccttcctgc 240
 cattgatata cccttatgag ccatggcggt tcaagcatga tcgacatcat 290

<210> 52
 <211> 1200
 <212> DNA
 <213> Arabidopsis thaliana

<400> 52
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 ttatctaata aacaattcag ccccaaattgc agaacacaca tagagctctc tattgattca 120

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aattacgatc tgatactgat aacgtctaga ttttttagggt taaagcaatc aatcacctga	180
cgattcaagg tggttggatc atgacgattc cagaaaacat caagcaagct ctcaaagcta	240
cactctttgg gatcatactg aactctaaca acctcgttat gtcccgtagt gccagtacag	300
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gcgaattgct gacctgaaga cggaacatca tcgtcgggtc cttgggcatg tgcggcggaa	480
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ttggctctgg agaaagagag tgcggcttta gagagagaat tgagagggtt agagagagat	660
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tgaaatttgg aacttttaag aggcagatag atttattatt tgtatccatt ttcttcattg	780
ttctagaatg tcgcggaaca aattttaaaa ctaaatccta aatttttcta attttgttgc	840
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gagcccaaag gttcgttttg cgttttatgt ttcggttcga tgccaacgcc acattctgag	960
ctaggcaaaa aacaaacgtg tctttgaata gactcctctc gttaacacat gcagcggctg	1020
catggtgacg ccattaacac gtggcctaca attgcatgat gtctccattg acacgtgact	1080
tctcgtctcc tttcttaata tatctaaca acactcctac ctcttccaaa atatatacac	1140
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<210> 53

<211> 2033

<212> DNA

<213> Linum usitatissimum

<400> 53

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agaagcaaga ctaaaaaaat tagctatgga cattcagggt catattggaa acatcattat	120
cctagtcttg tgaccatcct tcctcctgct ctagttgaga ggccttgga ctaacgagag	180
gtcagttggg atagcagatc cttatcctgg actagccttt ctggtgtttc agagtcttcg	240
tgccgccgtc tacatctatc tccattaggt ctgaagatga ctcttcacac caacgacgtt	300

pctau2013000426-seq1

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aagcctcatg aaagcattag ggaagaactt ttggttcttc ttgtcatggc ctttataggt	780
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ataatgtaac cccttagac tttatatatt tgcaattaaa aaaataattt aacttttaga	1560
ctttatatat agttttaata actaagttta accactctat tatttatatc gaaactattt	1620
gtatgtctcc cctctaaata aacttggtat tgtgtttaca gaacctataa tcaaataatc	1680
aatactcaac tgaagtttgt gcagttaatt gaagggatta acggccaaaa tgcactagta	1740
ttatcaaccg aatagattca cactagatgg ccatttccat caatatcatc gccgttcttc	1800
ttctgtccac atatcccctc tgaaacttga gagacacctg cacttcattg tccttattac	1860

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gtgttacaaa atgaaacca tgcattcatg caaactgaag aatggcgcaa gaacccttcc	1920
cctccatttc ttatgtggcg accatccatt tcaccatctc ccgctataaa acacccccat	1980
cacttcacct agaacatcat cactacttgc ttatccatcc aaaagatacc cac	2033

<210> 54
 <211> 253
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Nos polyadenylation signal

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atgacgttat ttatgagatg gggtttttatg attagagtcc cgcaattata catttaatac	180
gcgatagaaa acaaaatata gcgcgcaaac taggataaat tatcgcgcgc ggtgtcatct	240
atgttactag atc	253

<210> 55
 <211> 708
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Ocs polyadenylation signal

<400> 55	
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gtgcacgttg taaaaaacct gagcatgtgt agctcagatc cttaccgccg gtttcggttc	120
attctaataga atatatcacc cgttactatc gtatTTTTat gaataatatt ctccgttcaa	180
tttactgatt gtaccctact acttatatgt acaatattaa aatgaaaaca atatattgtg	240
ctgaataggt ttatagcgac atctatgata gagcgccaca ataacaaaca attgcgtttt	300
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gcag	1144