

SEQUENCE LISTING

<110> Novozymes A/S

Vind, Jesper

Borch, Kim

Svendsen, Allan

van der Lans, Robert

Mikkelsen, Lise M.

Jørgensen, Christian I.

Patkar, Shamkant

<120> POLYPEPTIDES HAVING LIPASE ACTIVITY AND POLYNUCLEOTIDES
ENCODING
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<160> 16

<170> PatentIn version 3.3

<210> 1

<211> 873

<212> DNA

<213> Thermomyces lanuginosus

<220>

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 Asn Leu Phe Ala Gln Tyr Ser Ala Ala Tyr Cys Gly Lys Asn Asn
 15 20 25

gat gcc cca gct ggt aca aac att acg tgc acg gga aat gcc tgc ccc 192
 Asp Ala Pro Ala Gly Thr Asn Ile Thr Cys Thr Gly Asn Ala Cys Pro
 30 35 40

gag gta gag aag gcg gat gca acg ttt ctc tac tcg ttt gaa gac tct 240
 Glu Val Glu Lys Ala Asp Ala Thr Phe Leu Tyr Ser Phe Glu Asp Ser
 45 50 55

gga gtg ggc gat gtc acc ggc ttc ctt gct ctc gac aac acg aac aaa 288
 Gly Val Gly Asp Val Thr Gly Phe Leu Ala Leu Asp Asn Thr Asn Lys
 60 65 70

ttg atc gtc ctc tct ttc cgt ggc tct cgt tcc ata gag aac tgg atc 336
 Leu Ile Val Leu Ser Phe Arg Gly Ser Arg Ser Ile Glu Asn Trp Ile
 75 80 85 90

ggg aat ctt aac ttc gac ttg aaa gaa ata aat gac att tgc tcc ggc 384
 Gly Asn Leu Asn Phe Asp Leu Lys Glu Ile Asn Asp Ile Cys Ser Gly
 95 100 105

tgc agg gga cat gac ggc ttc act tcg tcc tgg agg tct gta gcc gat 432
 Cys Arg Gly His Asp Gly Phe Thr Ser Ser Trp Arg Ser Val Ala Asp
 110 115 120

acg tta agg cag aag gtg gag gat gct gtg agg gag cat ccc gac tat 480
 Thr Leu Arg Gln Lys Val Glu Asp Ala Val Arg Glu His Pro Asp Tyr
 125 130 135

cgc gtg gtg ttt acc gga cat agc ttg ggt ggt gca ttg gca act gtt 528
 Arg Val Val Phe Thr Gly His Ser Leu Gly Gly Ala Leu Ala Thr Val
 140 145 150

gcc gga gca gac ctg cgt gga aat ggg tat gat atc gac gtg ttt tca 576
 Ala Gly Ala Asp Leu Arg Gly Asn Gly Tyr Asp Ile Asp Val Phe Ser
 155 160 165 170

tat ggc gcc ccc cga gtc gga aac agg gct ttt gca gaa ttc ctg acc 624
 Tyr Gly Ala Pro Arg Val Gly Asn Arg Ala Phe Ala Glu Phe Leu Thr

175 180 185

gta cag acc ggc gga aca ctc tac cgc att acc cac acc aat gat att 672
Val Gln Thr Gly Gly Thr Leu Tyr Arg Ile Thr His Thr Asn Asp Ile
190 195 200

gtc cct aga ctc ccg ccg cgc gaa ttc ggt tac agc cat tct agc cca 720
Val Pro Arg Leu Pro Pro Arg Glu Phe Gly Tyr Ser His Ser Ser Pro
205 210 215

gag tac tgg atc aaa tct gga acc ctt gtc ccc gtc acc cga aac gat 768
Glu Tyr Trp Ile Lys Ser Gly Thr Leu Val Pro Val Thr Arg Asn Asp
220 225 230

atc gtg aag ata gaa ggc atc gat gcc acc ggc ggc aat aac cag cct 816
Ile Val Lys Ile Glu Gly Ile Asp Ala Thr Gly Gly Asn Asn Gln Pro
235 240 245 250

aac att ccg gat atc cct gcg cac cta tgg tac ttc ggg tta att ggg 864
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<210> 2
<211> 291
<212> PRT
<213> Thermomyces lanuginosus

<400> 2

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Asn Leu Phe Ala Gln Tyr Ser Ala Ala Ala Tyr Cys Gly Lys Asn Asn
15 20 25

Asp Ala Pro Ala Gly Thr Asn Ile Thr Cys Thr Gly Asn Ala Cys Pro

30

35

40

Glu Val Glu Lys Ala Asp Ala Thr Phe Leu Tyr Ser Phe Glu Asp Ser
 45 50 55

Gly Val Gly Asp Val Thr Gly Phe Leu Ala Leu Asp Asn Thr Asn Lys
 60 65 70

Leu Ile Val Leu Ser Phe Arg Gly Ser Arg Ser Ile Glu Asn Trp Ile
 75 80 85 90

Gly Asn Leu Asn Phe Asp Leu Lys Glu Ile Asn Asp Ile Cys Ser Gly
 95 100 105

Cys Arg Gly His Asp Gly Phe Thr Ser Ser Trp Arg Ser Val Ala Asp
 110 115 120

Thr Leu Arg Gln Lys Val Glu Asp Ala Val Arg Glu His Pro Asp Tyr
 125 130 135

Arg Val Val Phe Thr Gly His Ser Leu Gly Gly Ala Leu Ala Thr Val
 140 145 150

Ala Gly Ala Asp Leu Arg Gly Asn Gly Tyr Asp Ile Asp Val Phe Ser
 155 160 165 170

Tyr Gly Ala Pro Arg Val Gly Asn Arg Ala Phe Ala Glu Phe Leu Thr
 175 180 185

Val Gln Thr Gly Gly Thr Leu Tyr Arg Ile Thr His Thr Asn Asp Ile
 190 195 200

Val Pro Arg Leu Pro Pro Arg Glu Phe Gly Tyr Ser His Ser Ser Pro
 205 210 215

Glu Tyr Trp Ile Lys Ser Gly Thr Leu Val Pro Val Thr Arg Asn Asp
220 225 230

Ile Val Lys Ile Glu Gly Ile Asp Ala Thr Gly Gly Asn Asn Gln Pro
235 240 245 250

Asn Ile Pro Asp Ile Pro Ala His Leu Trp Tyr Phe Gly Leu Ile Gly
255 260 265

Thr Cys Leu

<210> 3

<211> 265

<212> PRT

<213> Absidia reflexa

<400> 3

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1 5 10 15

Lys Ala His Thr Phe Tyr Thr Ala Leu Ser Ala Asn Ala Tyr Cys Arg
20 25 30

Thr Val Ile Pro Gly Gly Arg Trp Ser Cys Pro His Cys Gly Val Ala
35 40 45

Ser Asn Leu Gln Ile Thr Lys Thr Phe Ser Thr Leu Ile Thr Asp Thr
50 55 60

Asn Val Leu Val Ala Val Gly Glu Lys Glu Lys Thr Ile Tyr Val Val
65 70 75 80

Phe Arg Gly Thr Ser Ser Ile Arg Asn Ala Ile Ala Asp Ile Val Phe
85 90 95

Val Pro Val Asn Tyr Pro Pro Val Asn Gly Ala Lys Val His Lys Gly
100 105 110

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

Lys Ala Gln Leu Asp Arg His Pro Gly Tyr Lys Ile Val Val Thr Gly
130 135 140

His Ser Leu Gly Gly Ala Thr Ala Val Leu Ser Ala Leu Asp Leu Tyr
145 150 155 160

His His Gly His Ala Asn Ile Glu Ile Tyr Thr Gln Gly Gln Pro Arg
165 170 175

Ile Gly Thr Pro Ala Phe Ala Asn Tyr Val Ile Gly Thr Lys Ile Pro
180 185 190

Tyr Gln Arg Leu Val His Glu Arg Asp Ile Val Pro His Leu Pro Pro
195 200 205

Gly Ala Phe Gly Phe Leu His Ala Gly Glu Glu Phe Trp Ile Met Lys
210 215 220

Asp Ser Ser Leu Arg Val Cys Pro Asn Gly Ile Glu Thr Asp Asn Cys
225 230 235 240

Ser Asn Ser Ile Val Pro Phe Thr Ser Val Ile Asp His Leu Ser Tyr
245 250 255

Leu Asp Met Asn Thr Gly Leu Cys Leu
260 265

<210> 4

<211> 264

<212> PRT

<213> Absidia corymbifera

<400> 4

Ser Ser Ser Thr Gln Asp Tyr Arg Ile Ala Ser Glu Ala Glu Ile Lys
1 5 10 15

Ala His Thr Phe Tyr Thr Ala Leu Ser Ala Asn Ala Tyr Cys Arg Thr
20 25 30

Val Ile Pro Gly Gly Gln Trp Ser Cys Pro His Cys Asp Val Ala Pro
35 40 45

Asn Leu Asn Ile Thr Lys Thr Phe Thr Thr Leu Ile Thr Asp Thr Asn
50 55 60

Val Leu Val Ala Val Gly Glu Asn Glu Lys Thr Ile Tyr Val Val Phe
65 70 75 80

Arg Gly Thr Ser Ser Ile Arg Asn Ala Ile Ala Asp Ile Val Phe Val
85 90 95

Pro Val Asn Tyr Pro Pro Val Asn Gly Ala Lys Val His Lys Gly Phe
100 105 110

Leu Asp Ser Tyr Asn Glu Val Gln Asp Lys Leu Val Ala Glu Val Lys
115 120 125

Ala Gln Leu Asp Arg His Pro Gly Tyr Lys Ile Val Val Thr Gly His
130 135 140

Ser Leu Gly Gly Ala Thr Ala Val Leu Ser Ala Leu Asp Leu Tyr His
145 150 155 160

His Gly His Asp Asn Ile Glu Ile Tyr Thr Gln Gly Gln Pro Arg Ile
165 170 175

Gly Thr Pro Glu Phe Ala Asn Tyr Val Ile Gly Thr Lys Ile Pro Tyr
180 185 190

Gln Arg Leu Val Asn Glu Arg Asp Ile Val Pro His Leu Pro Pro Gly
195 200 205

Ala Phe Gly Phe Leu His Ala Gly Glu Glu Phe Trp Ile Met Lys Asp
210 215 220

Ser Ser Leu Arg Val Cys Pro Asn Gly Ile Glu Thr Asp Asn Cys Ser
225 230 235 240

Asn Ser Ile Val Pro Phe Thr Ser Val Ile Asp His Leu Ser Tyr Leu
245 250 255

Asp Met Asn Thr Gly Leu Cys Leu
260

<210> 5

<211> 269

<212> PRT

<213> Rhizomucor miehei

<400> 5

Ser Ile Asp Gly Gly Ile Arg Ala Ala Thr Ser Gln Glu Ile Asn Glu
1 5 10 15

Leu Thr Tyr Tyr Thr Thr Leu Ser Ala Asn Ser Tyr Cys Arg Thr Val
20 25 30

Ile Pro Gly Ala Thr Trp Asp Cys Ile His Cys Asp Ala Thr Glu Asp
35 40 45

Leu Lys Ile Ile Lys Thr Trp Ser Thr Leu Ile Tyr Asp Thr Asn Ala
50 55 60

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

Gly Ser Ser Ser Ile Arg Asn Trp Ile Ala Asp Leu Thr Phe Val Pro
 85 90 95

Val Ser Tyr Pro Pro Val Ser Gly Thr Lys Val His Lys Gly Phe Leu
 100 105 110

Asp Ser Tyr Gly Glu Val Gln Asn Glu Leu Val Ala Thr Val Leu Asp
 115 120 125

Gln Phe Lys Gln Tyr Pro Ser Tyr Lys Val Ala Val Thr Gly His Ser
 130 135 140

Leu Gly Gly Ala Thr Ala Leu Leu Cys Ala Leu Asp Leu Tyr Gln Arg
145 150 155 160

Glu Glu Gly Leu Ser Ser Ser Asn Leu Phe Leu Tyr Thr Gln Gly Gln
 165 170 175

Pro Arg Val Gly Asp Pro Ala Phe Ala Asn Tyr Val Val Ser Thr Gly
 180 185 190

Ile Pro Tyr Arg Arg Thr Val Asn Glu Arg Asp Ile Val Pro His Leu
 195 200 205

Pro Pro Ala Ala Phe Gly Phe Leu His Ala Gly Glu Glu Tyr Trp Ile
 210 215 220

Thr Asp Asn Ser Pro Glu Thr Val Gln Val Cys Thr Ser Asp Leu Glu
225 230 235 240

Thr Ser Asp Cys Ser Asn Ser Ile Val Pro Phe Thr Ser Val Leu Asp
 245 250 255

His Leu Ser Tyr Phe Gly Ile Asn Thr Gly Leu Cys Thr
260 265

<210> 6

<211> 271

<212> PRT

<213> *Rhizopus oryzae*

<400> 6

Ser Ala Ser Asp Gly Gly Lys Val Val Ala Ala Thr Thr Ala Gln Ile
1 5 10 15

Gln Glu Phe Thr Lys Tyr Ala Gly Ile Ala Ala Thr Ala Tyr Cys Arg
20 25 30

Ser Val Val Pro Gly Asn Lys Trp Asp Cys Val Gln Cys Gln Lys Trp
35 40 45

Val Pro Asp Gly Lys Ile Ile Thr Thr Phe Thr Ser Leu Leu Ser Asp
50 55 60

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

Val Phe Arg Gly Thr Asn Ser Phe Arg Ser Ala Ile Thr Asp Ile Val
85 90 95

Phe Asn Phe Ser Asp Tyr Lys Pro Val Lys Gly Ala Lys Val His Ala
100 105 110

Gly Phe Leu Ser Ser Tyr Glu Gln Val Val Asn Asp Tyr Phe Pro Val
115 120 125

Val Gln Glu Gln Leu Thr Ala His Pro Thr Tyr Lys Val Ile Val Thr
130 135 140

Gly His Ser Leu Gly Gly Ala Gln Ala Leu Leu Ala Gly Met Asp Leu
145 150 155 160

Tyr Gln Arg Glu Pro Arg Leu Ser Pro Lys Asn Leu Ser Ile Phe Thr
 165 170 175

Val Gly Gly Pro Arg Val Gly Asn Pro Thr Phe Ala Tyr Tyr Val Glu
 180 185 190

Ser Thr Gly Ile Pro Phe Gln Arg Thr Val His Lys Arg Asp Ile Val
 195 200 205

Pro His Val Pro Pro Gln Ser Phe Gly Phe Leu His Pro Gly Val Glu
 210 215 220

Ser Trp Ile Lys Ser Gly Thr Ser Asn Val Gln Ile Cys Thr Ser Glu
225 230 235 240

Ile Glu Thr Lys Asp Cys Ser Asn Ser Ile Val Pro Phe Thr Ser Ile
 245 250 255

Leu Asp His Leu Ser Tyr Phe Asp Ile Asn Glu Gly Ser Cys Leu
 260 265 270

<210> 7

<211> 267

<212> PRT

<213> Aspergillus niger

<400> 7

Thr Ala Gly His Ala Leu Ala Ala Ser Thr Gln Gly Ile Ser Glu Asp
1 5 10 15

Leu Tyr Ser Arg Leu Val Glu Met Ala Thr Ile Ser Gln Ala Ala Tyr
 20 25 30

Ala Asp Leu Cys Asn Ile Pro Ser Thr Ile Ile Lys Gly Glu Lys Ile
35 40 45

Tyr Asn Ser Gln Thr Asp Ile Asn Gly Trp Ile Leu Arg Asp Asp Ser
50 55 60

Ser Lys Glu Ile Ile Thr Val Phe Arg Gly Thr Gly Ser Asp Thr Asn
65 70 75 80

Leu Gln Leu Asp Thr Asn Tyr Thr Leu Thr Pro Phe Asp Thr Leu Pro
85 90 95

Gln Cys Asn Gly Cys Glu Val His Gly Gly Tyr Tyr Ile Gly Trp Val
100 105 110

Ser Val Gln Asp Gln Val Glu Ser Leu Val Lys Gln Gln Val Ser Gln
115 120 125

Tyr Pro Asp Tyr Ala Leu Thr Val Thr Gly His Ser Leu Gly Ala Ser
130 135 140

Leu Ala Ala Leu Thr Ala Ala Gln Leu Ser Ala Thr Tyr Asp Asn Ile
145 150 155 160

Arg Leu Tyr Thr Phe Gly Glu Pro Arg Ser Gly Asn Gln Ala Phe Ala
165 170 175

Ser Tyr Met Asn Asp Ala Phe Gln Ala Ser Ser Pro Asp Thr Thr Gln
180 185 190

Tyr Phe Arg Val Thr His Ala Asn Asp Gly Ile Pro Asn Leu Pro Pro
195 200 205

Val Glu Gln Gly Tyr Ala His Gly Gly Val Glu Tyr Trp Ser Val Asp

210 215 220

Pro Tyr Ser Ala Gln Asn Thr Phe Val Cys Thr Gly Asp Glu Val Gln
225 230 235 240

Cys Cys Glu Ala Gln Gly Gly Gln Gly Val Asn Asn Ala His Thr Thr
245 250 255

Tyr Phe Gly Met Thr Ser Gly Ala Cys Thr Trp
260 265

<210> 8

<211> 266

<212> PRT

<213> *Aspergillus tubingensis*

<400> 8

Thr Ala Gly His Ala Leu Ala Ala Ser Thr Gln Gly Ile Ser Glu Asp
1 5 10 15

Leu Tyr Ser Arg Leu Val Glu Met Ala Thr Ile Ser Gln Ala Ala Tyr
20 25 30

Ala Asp Leu Cys Asn Ile Pro Ser Thr Ile Ile Lys Gly Glu Lys Ile
35 40 45

Tyr Asn Ser Gln Thr Asp Ile Asn Gly Trp Ile Leu Arg Asp Asp Ser
50 55 60

Ser Lys Glu Ile Ile Thr Val Phe Arg Gly Thr Gly Ser Asp Thr Asn
65 70 75 80

Leu Gln Leu Asp Thr Asn Tyr Thr Leu Thr Pro Phe Asp Thr Leu Pro
85 90 95

Gln Cys Asn Ser Cys Glu Val His Gly Gly Tyr Tyr Ile Gly Trp Ile

100 105 110

Ser Val Gln Asp Gln Val Glu Ser Leu Val Gln Gln Gln Val Ser Gln
115 120 125

Phe Pro Asp Tyr Ala Leu Thr Val Thr Gly His Ser Leu Gly Ala Ser
130 135 140

Leu Ala Ala Leu Thr Ala Ala Gln Leu Ser Ala Thr Tyr Asp Asn Ile
145 150 155 160

Arg Leu Tyr Thr Phe Gly Glu Pro Arg Ser Asn Gln Ala Phe Ala Ser
165 170 175

Tyr Met Asn Asp Ala Phe Gln Ala Ser Ser Pro Asp Thr Thr Gln Tyr
180 185 190

Phe Arg Val Thr His Ala Asn Asp Gly Ile Pro Asn Leu Pro Pro Ala
195 200 205

Asp Glu Gly Tyr Ala His Gly Val Val Glu Tyr Trp Ser Val Asp Pro
210 215 220

Tyr Ser Ala Gln Asn Thr Phe Val Cys Thr Gly Asp Glu Val Gln Cys
225 230 235 240

Cys Glu Ala Gln Gly Gly Gln Gly Val Asn Asn Ala His Thr Thr Tyr
245 250 255

Phe Gly Met Thr Ser Gly His Cys Thr Trp
260 265

<210> 9

<211> 276

<212> PRT

<213> Fusarium oxysporum

<400> 9

Ala Val Gly Val Thr Thr Thr Asp Phe Ser Asn Phe Lys Phe Tyr Ile
1 5 10 15

Gln His Gly Ala Ala Ala Tyr Cys Asn Ser Glu Ala Ala Ala Gly Ser
20 25 30

Lys Ile Thr Cys Ser Asn Asn Gly Cys Pro Thr Val Gln Gly Asn Gly
35 40 45

Ala Thr Ile Val Thr Ser Phe Val Gly Ser Lys Thr Gly Ile Gly Gly
50 55 60

Tyr Val Ala Thr Asp Ser Ala Arg Lys Glu Ile Val Val Ser Phe Arg
65 70 75 80

Gly Ser Ile Asn Ile Arg Asn Trp Leu Thr Asn Leu Asp Phe Gly Gln
85 90 95

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

Arg Ala Trp Asn Glu Ile Ser Ser Gln Ala Thr Ala Ala Val Ala Ser
115 120 125

Ala Arg Lys Ala Asn Pro Ser Phe Asn Val Ile Ser Thr Gly His Ser
130 135 140

Leu Gly Gly Ala Val Ala Val Leu Ala Ala Ala Asn Leu Arg Val Gly
145 150 155 160

Gly Thr Pro Val Asp Ile Tyr Thr Tyr Gly Ser Pro Arg Val Gly Asn
165 170 175

Ala Gln Leu Ser Ala Phe Val Ser Asn Gln Ala Gly Gly Glu Tyr Arg
180 185 190

Val Thr His Ala Asp Asp Pro Val Pro Arg Leu Pro Pro Leu Ile Phe
195 200 205

Gly Tyr Arg His Thr Thr Pro Glu Phe Trp Leu Ser Gly Gly Gly Gly
210 215 220

Asp Lys Val Asp Tyr Thr Ile Ser Asp Val Lys Val Cys Glu Gly Ala
225 230 235 240

Ala Asn Leu Gly Cys Asn Gly Gly Thr Leu Gly Leu Asp Ile Ala Ala
245 250 255

His Leu His Tyr Phe Gln Ala Thr Asp Ala Cys Asn Ala Gly Gly Phe
260 265 270

Ser Trp Arg Arg
275

<210> 10

<211> 273

<212> PRT

<213> Fusarium heterosporum

<400> 10

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

Ala Asp Ala Ala Tyr Cys Asn Phe Asn Thr Ala Val Gly Lys Pro Val
20 25 30

His Cys Ser Ala Gly Asn Cys Pro Asp Ile Glu Lys Asp Ala Ala Ile
35 40 45

Val Val Gly Ser Val Val Gly Thr Lys Thr Gly Ile Gly Ala Tyr Val
50 55 60

Ala Thr Asp Asn Ala Arg Lys Glu Ile Val Val Ser Val Arg Gly Ser
65 70 75 80

Ile Asn Val Arg Asn Trp Ile Thr Asn Phe Asn Phe Gly Gln Lys Thr
85 90 95

Cys Asp Leu Val Ala Gly Cys Gly Val His Thr Gly Phe Leu Asp Ala
100 105 110

Trp Glu Glu Val Ala Ala Asn Val Lys Ala Ala Val Ser Ala Ala Lys
115 120 125

Thr Ala Asn Pro Thr Phe Lys Phe Val Val Thr Gly His Ser Leu Gly
130 135 140

Gly Ala Val Ala Thr Ile Ala Ala Ala Tyr Leu Arg Lys Asp Gly Phe
145 150 155 160

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

Phe Ala Asn Phe Val Thr Gln Gln Thr Gly Ala Glu Tyr Arg Val Thr
180 185 190

His Gly Asp Asp Pro Val Pro Arg Leu Pro Pro Ile Val Phe Gly Tyr
195 200 205

Arg His Thr Ser Pro Glu Tyr Trp Leu Asn Gly Gly Pro Leu Asp Lys
210 215 220

Asp Tyr Thr Val Thr Glu Ile Lys Val Cys Glu Gly Ile Ala Asn Val
225 230 235 240

Met Cys Asn Gly Gly Thr Ile Gly Leu Asp Ile Leu Ala His Ile Thr
245 250 255

Tyr Phe Gln Ser Met Ala Thr Cys Ala Pro Ile Ala Ile Pro Trp Lys
260 265 270

Arg

<210> 11

<211> 278

<212> PRT

<213> *Aspergillus oryzae*

<400> 11

Asp Ile Pro Thr Thr Gln Leu Glu Asp Phe Lys Phe Trp Val Gln Tyr
1 5 10 15

Ala Ala Ala Thr Tyr Cys Pro Asn Asn Tyr Val Ala Lys Asp Gly Glu
20 25 30

Lys Leu Asn Cys Ser Val Gly Asn Cys Pro Asp Val Glu Ala Ala Gly
35 40 45

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

Gly Phe Val Ala Val Asp Asn Thr Asn Lys Ala Ile Val Val Ala Phe
65 70 75 80

Arg Gly Ser Tyr Ser Ile Arg Asn Trp Val Thr Asp Ala Thr Phe Pro
85 90 95

Gln Thr Asp Pro Gly Leu Cys Asp Gly Cys Lys Ala Glu Leu Gly Phe
100 105 110

Trp Thr Ala Trp Lys Val Val Arg Asp Arg Ile Ile Lys Thr Leu Asp
115 120 125

Glu Leu Lys Pro Glu His Ser Asp Tyr Lys Ile Val Val Val Gly His
130 135 140

Ser Leu Gly Ala Ala Ile Ala Ser Leu Ala Ala Ala Asp Leu Arg Thr
145 150 155 160

Lys Asn Tyr Asp Ala Ile Leu Tyr Ala Tyr Ala Ala Pro Arg Val Ala
165 170 175

Asn Lys Pro Leu Ala Glu Phe Ile Thr Asn Gln Gly Asn Asn Tyr Arg
180 185 190

Phe Thr His Asn Asp Asp Pro Val Pro Lys Leu Pro Leu Leu Thr Met
195 200 205

Gly Tyr Val His Ile Ser Pro Glu Tyr Tyr Ile Thr Ala Pro Asp Asn
210 215 220

Thr Thr Val Thr Asp Asn Gln Val Thr Val Leu Asp Gly Tyr Val Asn
225 230 235 240

Phe Lys Gly Asn Thr Gly Thr Ser Gly Gly Leu Pro Asp Leu Leu Ala
245 250 255

Phe His Ser His Val Trp Tyr Phe Ile His Ala Asp Ala Cys Lys Gly
260 265 270

Pro Gly Leu Pro Leu Arg
275

<210> 12
<211> 278

<212> PRT

<213> *Penicillium camemberti*

<400> 12

Asp Val Ser Thr Ser Glu Leu Asp Gln Phe Glu Phe Trp Val Gln Tyr
1 5 10 15

Ala Ala Ala Ser Tyr Tyr Glu Ala Asp Tyr Thr Ala Gln Val Gly Asp
20 25 30

Lys Leu Ser Cys Ser Lys Gly Asn Cys Pro Glu Val Glu Ala Thr Gly
35 40 45

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

Gly Tyr Ile Ala Val Asp His Thr Asn Ser Ala Val Val Leu Ala Phe
65 70 75 80

Arg Gly Ser Tyr Ser Val Arg Asn Trp Val Ala Asp Ala Thr Phe Val
85 90 95

His Thr Asn Pro Gly Leu Cys Asp Gly Cys Leu Ala Glu Leu Gly Phe
100 105 110

Trp Ser Ser Trp Lys Leu Val Arg Asp Asp Ile Ile Lys Glu Leu Lys
115 120 125

Glu Val Val Ala Gln Asn Pro Asn Tyr Glu Leu Val Val Val Gly His
130 135 140

Ser Leu Gly Ala Ala Val Ala Thr Leu Ala Ala Thr Asp Leu Arg Gly
145 150 155 160

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

Gly Asn Ala Ala Leu Ala Lys Tyr Ile Thr Ala Gln Gly Asn Asn Phe
180 185 190

Arg Phe Thr His Thr Asn Asp Pro Val Pro Lys Leu Pro Leu Leu Ser
195 200 205

Met Gly Tyr Val His Val Ser Pro Glu Tyr Trp Ile Thr Ser Pro Asn
210 215 220

Asn Ala Thr Val Ser Thr Ser Asp Ile Lys Val Ile Asp Gly Asp Val
225 230 235 240

Ser Phe Asp Gly Asn Thr Gly Thr Gly Leu Pro Leu Leu Thr Asp Phe
245 250 255

Glu Ala His Ile Trp Tyr Phe Val Gln Val Asp Ala Gly Lys Gly Pro
260 265 270

Gly Leu Pro Phe Lys Arg
275

<210> 13

<211> 270

<212> PRT

<213> Aspergillus foetidus

<400> 13

Ser Val Ser Thr Ser Thr Leu Asp Glu Leu Gln Leu Phe Ala Gln Trp
1 5 10 15

Ser Ala Ala Ala Tyr Cys Ser Asn Asn Ile Asp Ser Lys Asp Ser Asn
20 25 30

Leu Thr Cys Thr Ala Asn Ala Cys Pro Ser Val Glu Glu Ala Ser Thr
35 40 45

Thr Met Leu Leu Glu Phe Asp Leu Thr Asn Asp Phe Gly Gly Thr Ala
50 55 60

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

Arg Gly Ser Ser Thr Ile Glu Asn Trp Ile Ala Asn Leu Asp Phe Ile
85 90 95

Leu Glu Asp Asn Asp Asp Leu Cys Thr Gly Cys Lys Val His Thr Gly
100 105 110

Phe Trp Lys Ala Trp Glu Ser Ala Ala Asp Glu Leu Thr Ser Lys Ile
115 120 125

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

His Ser Leu Gly Gly Ala Leu Ala Thr Leu Gly Ala Thr Val Leu Arg
145 150 155 160

Asn Asp Gly Tyr Ser Val Glu Leu Tyr Thr Tyr Gly Cys Pro Arg Ile
165 170 175

Gly Asn Tyr Ala Leu Ala Glu His Ile Thr Ser Gln Gly Ser Gly Ala
180 185 190

Asn Phe Arg Val Thr His Leu Asn Asp Ile Val Pro Arg Val Pro Pro
195 200 205

Met Asp Phe Gly Phe Ser Gln Pro Ser Pro Glu Tyr Trp Ile Thr Ser
210 215 220

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

225 230 235 240

Ile Asn Ser Thr Ala Gly Asn Ala Gly Glu Ala Thr Val Ser Val Leu
 245 250 255

Ala His Leu Trp Tyr Phe Phe Ala Ile Ser Glu Cys Leu Leu
 260 265 270

<210> 14

<211> 270

<212> PRT

<213> Aspergillus niger

<400> 14

Ser Val Ser Thr Ser Thr Leu Asp Glu Leu Gln Leu Phe Ser Gln Trp
1 5 10 15

Ser Ala Ala Ala Tyr Cys Ser Asn Asn Ile Asp Ser Asp Asp Ser Asn
 20 25 30

Val Thr Cys Thr Ala Asp Ala Cys Pro Ser Val Glu Glu Ala Ser Thr
 35 40 45

Lys Met Leu Leu Glu Phe Asp Leu Thr Asn Asn Phe Gly Gly Thr Ala
 50 55 60

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

Arg Gly Ser Ser Thr Ile Lys Asn Trp Ile Ala Asp Leu Asp Phe Ile
 85 90 95

Leu Gln Asp Asn Asp Asp Leu Cys Thr Gly Cys Lys Val His Thr Gly
 100 105 110

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

115 120 125

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

His Ser Leu Gly Gly Ala Leu Ala Thr Leu Gly Ala Thr Val Leu Arg
145 150 155 160

Asn Asp Gly Tyr Ser Val Glu Leu Tyr Thr Tyr Gly Cys Pro Arg Val
165 170 175

Gly Asn Tyr Ala Leu Ala Glu His Ile Thr Ser Gln Gly Ser Gly Ala
180 185 190

Asn Phe Pro Val Thr His Leu Asn Asp Ile Val Pro Arg Val Pro Pro
195 200 205

Met Asp Phe Gly Phe Ser Gln Pro Ser Pro Glu Tyr Trp Ile Thr Ser
210 215 220

Gly Thr Gly Ala Ser Val Thr Ala Ser Asp Ile Glu Leu Ile Glu Gly
225 230 235 240

Ile Asn Ser Thr Ala Gly Asn Ala Gly Glu Ala Thr Val Asp Val Leu
245 250 255

Ala His Leu Trp Tyr Phe Phe Ala Ile Ser Glu Cys Leu Leu
260 265 270

<210> 15

<211> 269

<212> PRT

<213> *Aspergillus oryzae*

<400> 15

Asp Val Ser Ser Ser Leu Leu Asn Asn Leu Asp Leu Phe Ala Gln Tyr

1 5 10 15

Ser Ala Ala Ala Tyr Cys Asp Glu Asn Leu Asn Ser Thr Gly Thr Lys
20 25 30

Leu Thr Cys Ser Val Gly Asn Cys Pro Leu Val Glu Ala Ala Ser Thr
35 40 45

Gln Ser Leu Asp Glu Phe Asn Glu Ser Ser Ser Tyr Gly Asn Pro Ala
50 55 60

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

Arg Gly Ser Ala Asp Leu Ala Asn Trp Val Ala Asn Leu Asn Phe Gly
85 90 95

Leu Glu Asp Ala Ser Asp Leu Cys Ser Gly Cys Glu Val His Ser Gly
100 105 110

Phe Trp Lys Ala Trp Ser Glu Ile Ala Asp Thr Ile Thr Ser Lys Val
115 120 125

Glu Ser Ala Leu Ser Asp His Ser Asp Tyr Ser Leu Val Leu Thr Gly
130 135 140

His Ser Tyr Gly Ala Ala Leu Ala Ala Leu Ala Ala Thr Ala Leu Arg
145 150 155 160

Asn Ser Gly His Ser Val Glu Leu Tyr Asn Tyr Gly Gln Pro Arg Leu
165 170 175

Gly Asn Glu Ala Leu Ala Thr Tyr Ile Thr Asp Gln Asn Lys Gly Gly
180 185 190

Asn Tyr Arg Val Thr His Thr Asn Asp Ile Val Pro Lys Leu Pro Pro
195 200 205

Thr Leu Leu Gly Tyr His His Phe Ser Pro Glu Tyr Tyr Ile Ser Ser
210 215 220

Ala Asp Glu Ala Thr Val Thr Thr Thr Asp Val Thr Glu Val Thr Gly
225 230 235 240

Ile Asp Ala Thr Gly Gly Asn Asp Gly Thr Asp Gly Thr Ser Ile Asp
245 250 255

Ala His Arg Trp Tyr Phe Ile Tyr Ile Ser Glu Cys Ser
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<211> 251

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<213> Landerina penisapora

<400> 16

Pro Gln Asp Ala Tyr Thr Ala Ser His Ala Asp Leu Val Lys Tyr Ala
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Thr Tyr Ala Gly Leu Ala Tyr Gln Thr Thr Asp Ala Trp Pro Ala Ser
20 25 30

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

Leu Lys Gly Ser Ser Gly Tyr Ile Ala Phe Asn Glu Pro Cys Lys Glu
50 55 60

Ile Ile Val Ala Tyr Arg Gly Thr Asp Ser Leu Ile Asp Trp Leu Thr
65 70 75 80

Asn Leu Asn Phe Asp Lys Thr Ala Trp Pro Ala Asn Ile Ser Asn Ser
85 90 95

Leu Val His Glu Gly Phe Leu Asn Ala Tyr Leu Val Ser Met Gln Gln
100 105 110

Val Gln Glu Ala Val Asp Ser Leu Leu Ala Lys Cys Pro Asp Ala Thr
115 120 125

Ile Ser Phe Thr Gly His Ser Leu Gly Gly Ala Leu Ala Cys Ile Ser
130 135 140

Met Val Asp Thr Ala Gln Arg His Arg Gly Ile Lys Met Gln Met Phe
145 150 155 160

Thr Tyr Gly Gln Pro Arg Thr Gly Asn Gln Ala Phe Ala Glu Tyr Val
165 170 175

Glu Asn Leu Gly His Pro Val Phe Arg Val Val Tyr Arg His Asp Ile
180 185 190

Val Pro Arg Met Pro Pro Met Asp Leu Gly Phe Gln His His Gly Gln
195 200 205

Glu Val Trp Tyr Glu Gly Asp Glu Asn Ile Lys Phe Cys Lys Gly Glu
210 215 220

Gly Glu Asn Leu Thr Cys Glu Leu Gly Val Pro Phe Ser Glu Leu Asn
225 230 235 240

Ala Lys Asp His Ser Glu Tyr Pro Gly Met His
245 250