

SEQUENCE LISTING.txt

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<110> AB Enzymes Oy
<120> A fungal serine protease and use thereof
<130> A9360PC
<150> FI 20095499
<151> 2009-04-30
<160> 18
<170> PatentIn version 3.5

<210> 1
<211> 10
<212> PRT
<213> Fusarium acuminatum

<220>
<221> MISC_FEATURE
<223> Sequence of an aminoterminal peptide #3811 from Fusarium
acuminatum RF7182 protease.

<220>
<221> VARIANT
<222> (2)..(2)
<223> /replace= "Ile"

<220>
<221> misc_feature
<222> (4)..(4)
<223> Xaa can be any naturally occurring amino acid

<400> 1
Ala Leu Thr Xaa Gln Ser Asn Ala Pro Trp
1 5 10

<210> 2
<211> 12
<212> PRT
<213> Fusarium acuminatum

<220>
<221> MISC_FEATURE
<223> Sequence of a tryptic peptide 1609,880 from Fusarium acuminatum
RF7182 protease.

<220>
<221> VARIANT
<222> (7)..(7)
<223> /replace= "Ile"

<220>
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<222> (9)..(9)
<223> /replace= "Ile"

<400> 2
Ser Gly Ala Pro Trp Gly Leu Gln Leu Ser His Lys
1 5 10

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# SEQUENCE LISTING.txt

<210> 3  
 <211> 18  
 <212> PRT  
 <213> Fusarium acuminatum

<220>  
 <221> MISC\_FEATURE  
 <223> Sequence of a tryptic peptide 1793,957 from Fusarium acuminatum RF7182 protease.

<220>  
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 <222> (1)..(1)  
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<220>  
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 <223> /replace= "Ile"

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 <222> (15)..(15)  
 <223> /replace= "Ile"

<400> 3

Ala Ala Thr Thr Gln Ser Gly Ala Pro Trp Gly Leu Gly Ala Leu Ser  
 1 5 10 15

His Lys

<210> 4  
 <211> 7  
 <212> PRT  
 <213> Fusarium acuminatum

<220>  
 <221> MISC\_FEATURE  
 <223> Sequence of a tryptic peptide 743,494 from Fusarium acuminatum RF7182 protease.

<220>  
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 <223> /replace= "Asn"

# SEQUENCE LISTING.txt

<220>  
 <221> VARIANT  
 <222> (2)..(2)  
 <223> /replace= "Asn"

<220>  
 <221> VARIANT  
 <222> (3)..(3)  
 <223> /replace= "Ile"

<220>  
 <221> VARIANT  
 <222> (4)..(4)  
 <223> /replace= "Ile"

<400> 4

Ala Ala Leu Leu Ser Val Lys  
 1 5

<210> 5  
 <211> 6  
 <212> PRT  
 <213> Fusarium acuminatum

<220>  
 <221> MISC\_FEATURE  
 <223> Sequence of a tryptic peptide 2103,832 (start 2045,06) from  
 Fusarium acuminatum RF7182 protease.

<400> 5

Gly Gly Ala His Thr Asp  
 1 5

<210> 6  
 <211> 14  
 <212> PRT  
 <213> Fusarium acuminatum

<220>  
 <221> MISC\_FEATURE  
 <223> Sequence of a tryptic peptide 2103,832 (start 1406,57) from  
 Fusarium acuminatum RF7182 protease.

<220>  
 <221> VARIANT  
 <222> (11)..(11)  
 <223> /replace= "Ile"

<400> 6

Asn Gly His Gly Thr His Val Ala Gly Thr Leu Asn Thr Lys  
 1 5 10

<210> 7  
 <211> 31  
 <212> PRT  
 <213> Fusarium acuminatum

<220>

# SEQUENCE LISTING.txt

<221> MISC\_FEATURE  
<223> Sequence of a tryptic peptide 3662,692 from *Fusarium acuminatum* RF7182 protease.

<220>  
<221> VARIANT  
<222> (4)..(4)  
<223> /replace= "Ile"

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<223> /replace= "Ile"

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<223> /replace= "Ile"

<220>  
<221> VARIANT  
<222> (29)..(29)  
<223> /replace= "Ile"

<400> 7

Thr Ser Tyr Leu Tyr Asp Thr Thr Ala Gly Ser Gly Ser Tyr Gly Tyr  
1 5 10 15

Val Val Asp Ser Gly Leu Asn Leu Ala His Tyr Ser Leu Asn Arg  
20 25 30

<210> 8  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> The sequence of the oligonucleotide primer PR0123 derived from the peptide SEQ ID NO:3.

<220>  
<221> misc\_feature  
<222> (3)..(3)  
<223> r is a or g

<220>  
<221> misc\_feature  
<222> (4)..(4)  
<223> w is a or t

<220>  
<221> misc\_feature  
<222> (6)..(6)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (9)..(9)  
<223> n is a, c, g, or t

<220>  
<221> misc\_feature  
<222> (12)..(12)  
<223> n is a, c, g, or t

SEQUENCE LISTING.txt

<220>  
 <221> misc\_feature  
 <222> (15)..(15)  
 <223> n is a, c, g, or t

<400> 8  
 carwcnggng cnccntgggg

20

<210> 9  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> The sequence of the oligonucleotide primer PRO122 derived from the peptide SEQ ID NO:6.

<220>  
 <221> misc\_feature  
 <222> (3)..(3)  
 <223> y is t or c

<220>  
 <221> misc\_feature  
 <222> (6)..(6)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (9)..(9)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (12)..(12)  
 <223> y is t or c

<220>  
 <221> misc\_feature  
 <222> (15)..(15)  
 <223> n is a, c, g, or t

<220>  
 <221> misc\_feature  
 <222> (18)..(18)  
 <223> n is a, c, g, or t

<400> 9  
 cayggnacnc aygtngcngg

20

<210> 10  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> The sequence of the serine protease consensus oligonucleotide primer PRO60.

<220>  
 <221> misc\_feature  
 <222> (2)..(2)  
 <223> m is a or c

# SEQUENCE LISTING.txt

<220>  
 <221> misc\_feature  
 <222> (3)..(3)  
 <223> r is a or g

<220>  
 <221> misc\_feature  
 <222> (9)..(9)  
 <223> r is a or g

<220>  
 <221> misc\_feature  
 <222> (15)..(15)  
 <223> w is a or t

<220>  
 <221> misc\_feature  
 <222> (18)..(18)  
 <223> r is a or g

<220>  
 <221> misc\_feature  
 <222> (21)..(21)  
 <223> s is c or g

<400> 10  
 gmrGCCatrg aggtwccrgt sa

22

<210> 11  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> The sequence of the serine protease consensus oligonucleotide primer PR061.

<220>  
 <221> misc\_feature  
 <222> (3)..(3)  
 <223> m is a or c

<220>  
 <221> misc\_feature  
 <222> (5)..(5)  
 <223> m is a or c

<220>  
 <221> misc\_feature  
 <222> (6)..(6)  
 <223> r is a or g

<220>  
 <221> misc\_feature  
 <222> (12)..(12)  
 <223> r is a or g

<220>  
 <221> misc\_feature  
 <222> (18)..(18)  
 <223> w is a or t

<400> 11  
 ggmgmrGCCa trgaggtwcc

20

# SEQUENCE LISTING.txt

<210> 12  
 <211> 753  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> The sequence of the PCR fragment obtained using the primers PRO123 (SEQ ID NO:8) and PRO61 (SEQ ID NO:11) and *Fusarium acuminatum* RF7182 genomic DNA as a template.

<400> 12  
 cagtctggtg cgccctgggg tctcggtgcc atctcccaca agtcgtctgg ctccaccagc 60  
 tacatctacg acaccactgc cggtagcggc tcttacggat atgtcgtaga tagtggtatc 120  
 aacatcgccc ataccgactt tgggtggccgt gctactctcg gctacaacgc tgctggtggt 180  
 gctcacaccg ataccctcgg ccacggaacc cacgttgctg gtaccatcgg tggcaccaag 240  
 tatggtgtct ccaagaaggc caacctcatc tctgtcaagg tcttcgccgg taaccaggct 300  
 gctacatctg ttatccttga tggctttaac tgggccgtca aacgacatca cctccaaggg 360  
 ccgtgctggc aagtccgta tcaacatgtc tctcggttaag tagtttcgca ctcagaccta 420  
 tacatggaaa tctaatacca agacaccagg cggaccttct tctgctactt ggaccactgc 480  
 catcaacgct ggatacaacg ctggtgtcct ctccgttgct gctgccggta acggtgatgt 540  
 caatggcaac cctctccccg tctctagcca gtctcctgcc aacgccccca acgccctgac 600  
 cgtcgctgcc attgactcca actggcgcac tgcctctttc accaactacg gtgccgggtg 660  
 tgatatcttc ggccccggtg tcaacattct gtccgcctgg atcgggtcca gcaccgctac 720  
 caacaccatc agcggaacct ccatggcctc gcc 753

<210> 13  
 <211> 1353  
 <212> DNA  
 <213> *Fusarium acuminatum*

<220>  
 <221> misc\_feature  
 <223> The nucleotide sequence of the full-length *Fusarium acuminatum* RF7182 protease gene (Fa prts8A).

<400> 13  
 atgactagca tccgccgcct cgctctctac cttggagctc tgctccctgc agtgcttgct 60  
 gctcctgctg gcgtctccaa ggtcgctaag ctcgactctg tgcccgacaa gtacatcatc 120  
 accctcaagc ctgattcctc tgacgccaag gtcgaggctc acttgagctg ggtcgagggc 180  
 gtccaccgcc gcagccttgc taagcgcgac accgtcggtg ttgagaagac tttcaacatc 240  
 agcagctgga gcgcttactc tggcgagttc gaccaggcta ccattgatga gatcaagaag 300  
 agccctgagg taagccttcc ggtactggcc taagtaacac aaatcaccaa catgccatag 360  
 gttgctttcg ttgagcctga ctacactgtc tacctggact atgaggagtc atctgagctg 420  
 tctgaccgcg ctctgaccac ccagtctggt gctccctggg gtctcggtgc catctccac 480  
 aagtcgtctg gtcaccag ctacatctac gacaccactg ccggtagcgg ctcttacgga 540

# SEQUENCE LISTING.txt

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tatgtcgtag atagtggat caacatcgcc cataccgact ttggtggccg tgctactctc      600
ggctacaacg ctgctgggtg tgctcacacc gataccctcg gccacggaac ccacgttgct      660
ggtaccatcg gtggcaccaa gtatgggtgc tccaagaagg ccaacctcat ctctgtcaag      720
gtcttcgccg gtaaccaggc tgctacatct gttatccttg atggctttaa ctgggccgctc      780
aacgacatca cctccaaggg ccgtgctggc aagtccgtta tcaacatgtc tctcggttaag      840
tagtttcgca ctcagaccta tacatggaaa tcactaacca agacaccagg cggaccttct      900
tctgtacttt ggaccactgc catcaacgct ggatacaacg ctggtgtcct ctccgttgctc      960
gctgccggta acggtgatgt caatggcaac cctctccccg tctctagcca gtctcctgcc     1020
aacgccccca acgccctgac cgctcgtgcc attgactcca actggcgcac tgcctctttc     1080
accaactacg gtgccggtgt tgatatcttc ggccccggtg tcaacattct gtccgcctgg     1140
atcggctcca gcaccgctac caacaccatc agcggaactt ccattggcctc cccccacctt     1200
gctggtcttg ctctctacct ccaggtcctt gagggcttta gcactcctgc tgctgtcacc     1260
aaccgcatca aggctcttgg tacctctggc aaggtcactg gtagcctcag cggcagcccc     1320
aacctcgttg cctacaacgg taacggtgct tag                                     1353
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```
<210> 14
<211> 415
<212> PRT
<213> Fusarium acuminatum
```

```
<220>
<221> misc_feature
<223> The deduced amino acid sequence of the full-length Fusarium
acuminatum RF7182 protease (Fa_RF7182), including amino acids
Met1 to Ala415.
```

```
<400> 14
```

```
Met Thr Ser Ile Arg Arg Leu Ala Leu Tyr Leu Gly Ala Leu Leu Pro
1           5           10           15
```

```
Ala Val Leu Ala Ala Pro Ala Gly Val Ser Lys Val Ala Lys Leu Asp
20           25           30
```

```
Ser Val Pro Asp Lys Tyr Ile Ile Thr Leu Lys Pro Asp Ser Ser Asp
35           40           45
```

```
Ala Lys Val Glu Ala His Leu Ser Trp Val Glu Gly Val His Arg Arg
50           55           60
```

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

```
Ser Ser Trp Ser Ala Tyr Ser Gly Glu Phe Asp Gln Ala Thr Ile Asp
85           90           95
```



SEQUENCE LISTING.txt

Glu Ile Lys Lys Ser Pro Glu Val Ala Phe Val Glu Pro Asp Tyr Thr  
100 105 110

Val Tyr Leu Asp Tyr Glu Glu Ser Ser Glu Leu Ser Asp Arg Ala Leu  
115 120 125

Thr Thr Gln Ser Gly Ala Pro Trp Gly Leu Gly Ala Ile Ser His Lys  
130 135 140

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

Ser Tyr Gly Tyr Val Val Asp Ser Gly Ile Asn Ile Ala His Thr Asp  
165 170 175

Phe Gly Gly Arg Ala Thr Leu Gly Tyr Asn Ala Ala Gly Gly Ala His  
180 185 190

Thr Asp Thr Leu Gly His Gly Thr His Val Ala Gly Thr Ile Gly Gly  
195 200 205

Thr Lys Tyr Gly Val Ser Lys Lys Ala Asn Leu Ile Ser Val Lys Val  
210 215 220

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

Trp Ala Val Asn Asp Ile Thr Ser Lys Gly Arg Ala Gly Lys Ser Val  
245 250 255

Ile Asn Met Ser Leu Gly Gly Pro Ser Ser Ala Thr Trp Thr Thr Ala  
260 265 270

Ile Asn Ala Gly Tyr Asn Ala Gly Val Leu Ser Val Val Ala Ala Gly  
275 280 285

Asn Gly Asp Val Asn Gly Asn Pro Leu Pro Val Ser Ser Gln Ser Pro  
290 295 300

Ala Asn Ala Pro Asn Ala Leu Thr Val Ala Ala Ile Asp Ser Asn Trp  
305 310 315 320

Arg Thr Ala Ser Phe Thr Asn Tyr Gly Ala Gly Val Asp Ile Phe Gly  
325 330 335

Pro Gly Val Asn Ile Leu Ser Ala Trp Ile Gly Ser Ser Thr Ala Thr  
340 345 350

Asn Thr Ile Ser Gly Thr Ser Met Ala Ser Pro His Leu Ala Gly Leu  
355 360 365

SEQUENCE LISTING.txt

Ala Leu Tyr Leu Gln Val Leu Glu Gly Leu Ser Thr Pro Ala Ala Val  
370 375 380

Thr Asn Arg Ile Lys Ala Leu Gly Thr Ser Gly Lys Val Thr Gly Ser  
385 390 395 400

Leu Ser Gly Ser Pro Asn Leu Val Ala Tyr Asn Gly Asn Gly Ala  
405 410 415

<210> 15  
<211> 1293  
<212> DNA  
<213> *Fusarium acuminatum*

<220>  
<221> misc\_feature  
<223> The nucleotide sequence encoding the amino acid sequence of the proenzyme form of *Fusarium acuminatum* RF7182 protease.

<400> 15  
gctcctgctg gcgtctccaa ggtcgctaag ctcgactctg tgcccgacaa gtacatcatc 60  
accctcaagc ctgattcctc tgacgccaag gtcgaggctc acttgagctg ggtcgagggc 120  
gtccaccgcc gcagccttgc taagcgcgac accgtcggtg ttgagaagac tttcaacatc 180  
agcagctgga gcgcttactc tggcgagttc gaccaggcta ccattgatga gatcaagaag 240  
agccctgagg taagccttcc ggtactggcc taagtaacac aaatcaccaa catgccatag 300  
gttgcttttcg ttgagcctga ctacactgtc tacctggact atgaggagtc atctgagctg 360  
tctgaccgcg ctctgaccac ccagtctggt gctccctggg gtctcggtgc catctccac 420  
aagtcgtctg gtcaccag ctacatctac gacaccactg ccggtagcgg ctcttacgga 480  
tatgtcgtag atagtggat caacatcgcc cataccgact ttggtggccg tgctactctc 540  
ggctacaacg ctgctggtgg tgctcacacc gataccctcg gccacggaac ccacgttgct 600  
ggtaccatcg gtggcaccaa gtatggtgtc tccaagaagg ccaacctcat ctctgtcaag 660  
gtcttcgccg gtaaccaggc tgctacatct gttatccttg atggctttaa ctgggccgctc 720  
aacgacatca cctccaaggg ccgtgctggc aagtccgtta tcaacatgtc tctcggtaag 780  
tagtttcgca ctcagaccta tacatggaaa tactaacca agacaccagg cggaccttct 840  
tctgctactt ggaccactgc catcaacgct ggatacaacg ctggtgtcct ctccgttgctc 900  
gctgccggta acggtgatgt caatggcaac cctctccccg tctctagcca gtctcctgcc 960  
aacgccccca acgcccgtgac cgctcgctgcc attgactcca actggcgcac tgcctctttc 1020  
accaactacg gtgccggtgt tgatatcttc ggccccggtg tcaacattct gtccgcctgg 1080  
atcggctcca gcaccgtac caacaccatc agcggaactt ccatggcctc cccccacctt 1140  
gctggtcttg ctctctacct ccaggtcctt gagggcttta gactcctgc tgctgtcacc 1200  
aaccgcatca aggctcttgg tacctctggc aaggctactg gtagcctcag cggcagcccc 1260  
aacctcgttg cctacaacgg taacggtgct tag 1293

# SEQUENCE LISTING.txt

<210> 16  
 <211> 395  
 <212> PRT  
 <213> Fusarium acuminatum

<220>  
 <221> MISC\_FEATURE  
 <223> The amino acid sequence of the proenzyme form of Fusarium acuminatum RF7182 protease, including amino acids Ala21 to Ala415 of the full-length protease.

<400> 16

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

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

Ala His Leu Ser Trp Val Glu Gly Val His Arg Arg Ser Leu Ala Lys  
 35 40 45

Arg Asp Thr Val Gly Val Glu Lys Thr Phe Asn Ile Ser Ser Trp Ser  
 50 55 60

Ala Tyr Ser Gly Glu Phe Asp Gln Ala Thr Ile Asp Glu Ile Lys Lys  
 65 70 75 80

Ser Pro Glu Val Ala Phe Val Glu Pro Asp Tyr Thr Val Tyr Leu Asp  
 85 90 95

Tyr Glu Glu Ser Ser Glu Leu Ser Asp Arg Ala Leu Thr Thr Gln Ser  
 100 105 110

Gly Ala Pro Trp Gly Leu Gly Ala Ile Ser His Lys Ser Ser Gly Ser  
 115 120 125

Thr Ser Tyr Ile Tyr Asp Thr Thr Ala Gly Ser Gly Ser Tyr Gly Tyr  
 130 135 140

Val Val Asp Ser Gly Ile Asn Ile Ala His Thr Asp Phe Gly Gly Arg  
 145 150 155 160

Ala Thr Leu Gly Tyr Asn Ala Ala Gly Gly Ala His Thr Asp Thr Leu  
 165 170 175

Gly His Gly Thr His Val Ala Gly Thr Ile Gly Gly Thr Lys Tyr Gly  
 180 185 190

Val Ser Lys Lys Ala Asn Leu Ile Ser Val Lys Val Phe Ala Gly Asn  
 195 200 205

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

SEQUENCE LISTING.txt

210

215

220

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

Leu Gly Gly Pro Ser Ser Ala Thr Trp Thr Thr Ala Ile Asn Ala Gly  
245 250 255

Tyr Asn Ala Gly Val Leu Ser Val Val Ala Ala Gly Asn Gly Asp Val  
260 265 270

Asn Gly Asn Pro Leu Pro Val Ser Ser Gln Ser Pro Ala Asn Ala Pro  
275 280 285

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

Phe Thr Asn Tyr Gly Ala Gly Val Asp Ile Phe Gly Pro Gly Val Asn  
305 310 315 320

Ile Leu Ser Ala Trp Ile Gly Ser Ser Thr Ala Thr Asn Thr Ile Ser  
325 330 335

Gly Thr Ser Met Ala Ser Pro His Leu Ala Gly Leu Ala Leu Tyr Leu  
340 345 350

Gln Val Leu Glu Gly Leu Ser Thr Pro Ala Ala Val Thr Asn Arg Ile  
355 360 365

Lys Ala Leu Gly Thr Ser Gly Lys Val Thr Gly Ser Leu Ser Gly Ser  
370 375 380

Pro Asn Leu Val Ala Tyr Asn Gly Asn Gly Ala  
385 390 395

<210> 17  
<211> 924  
<212> DNA  
<213> *Fusarium acuminatum*

<220>  
<221> misc\_feature  
<223> The nucleotide sequence encoding the amino acid sequence of the  
mature form of *Fusarium acuminatum* RF7182 protease.

<400> 17  
gctctgacca cccagtctgg tgctccctgg ggtctcggtg ccatctccca caagtcgtct 60  
ggctccacca gctacatcta cgacaccact gccggtagcg gctcttacgg atatgtcgta 120  
gatagtggta tcaacatcgc ccataccgac tttggtggcc gtgctactct cggctacaac 180  
gctgctggtg gtgctcacac cgataccctc ggccacggaa cccacgttgc tggtaccatc 240  
ggtggcacca agtatggtgt ctccaagaag gccaacctca tctctgtcaa ggtcttcgcc 300

SEQUENCE LISTING.txt

```

ggtaaccagg ctgctacatc tgttatcctt gatggcttta actgggccgt caacgacatc      360
acctccaagg gccgtgctgg caagtccgtt atcaacatgt ctctcggtaa gtagtttcgc      420
actcagacct atacatggaa atcactaacc aagacaccag gcggaccttc ttctgctact      480
tggaacctg ccatcaacgc tggatacaac gctggtgtcc tctccgttgt cgctgccggt      540
aacggtgatg tcaatggcaa ccctctcccc gtctctagcc agtctcctgc caacgcccc      600
aacgccctga ccgtcgctgc cattgactcc aactggcgca ctgcctcttt caccaactac      660
ggtgccggtg ttgatatctt cggccccggt gtcaacattc tgtccgcctg gatcggctcc      720
agcaccgcta ccaacaccat cagcggaact tccatggcct ccccccacct tgctggtctt      780
gctctctacc tccaggtcct tgagggctct agcactcctg ctgctgtcac caaccgcatc      840
aaggctcttg gtacctctgg caaggtcact ggtagcctca gcggcagccc caacctcggt      900
gcctacaacg gtaacggtgc ttag                                           924

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```

<210> 18
<211> 289
<212> PRT
<213> Fusarium acuminatum

```

```

<220>
<221> MISC_FEATURE
<223> The amino acid sequence of the mature form of Fusarium acuminatum
      RF7182 protease, including amino acids Ala127 to Ala415 of the
      full-length protease.

```

<400> 18

```

Ala Leu Thr Thr Gln Ser Gly Ala Pro Trp Gly Leu Gly Ala Ile Ser
 1             5             10             15

```

```

His Lys Ser Ser Gly Ser Thr Ser Tyr Ile Tyr Asp Thr Thr Ala Gly
      20             25             30

```

```

Ser Gly Ser Tyr Gly Tyr Val Val Asp Ser Gly Ile Asn Ile Ala His
      35             40             45

```

```

Thr Asp Phe Gly Gly Arg Ala Thr Leu Gly Tyr Asn Ala Ala Gly Gly
      50             55             60

```

```

Ala His Thr Asp Thr Leu Gly His Gly Thr His Val Ala Gly Thr Ile
      65             70             75             80

```

```

Gly Gly Thr Lys Tyr Gly Val Ser Lys Lys Ala Asn Leu Ile Ser Val
      85             90             95

```

```

Lys Val Phe Ala Gly Asn Gln Ala Ala Thr Ser Val Ile Leu Asp Gly
      100            105            110

```

```

Phe Asn Trp Ala Val Asn Asp Ile Thr Ser Lys Gly Arg Ala Gly Lys
      115            120            125

```

SEQUENCE LISTING.txt

Ser Val Ile Asn Met Ser Leu Gly Gly Pro Ser Ser Ala Thr Trp Thr  
130 135 140

Thr Ala Ile Asn Ala Gly Tyr Asn Ala Gly Val Leu Ser Val Val Ala  
145 150 155 160

Ala Gly Asn Gly Asp Val Asn Gly Asn Pro Leu Pro Val Ser Ser Gln  
165 170 175

Ser Pro Ala Asn Ala Pro Asn Ala Leu Thr Val Ala Ala Ile Asp Ser  
180 185 190

Asn Trp Arg Thr Ala Ser Phe Thr Asn Tyr Gly Ala Gly Val Asp Ile  
195 200 205

Phe Gly Pro Gly Val Asn Ile Leu Ser Ala Trp Ile Gly Ser Ser Thr  
210 215 220

Ala Thr Asn Thr Ile Ser Gly Thr Ser Met Ala Ser Pro His Leu Ala  
225 230 235 240

Gly Leu Ala Leu Tyr Leu Gln Val Leu Glu Gly Leu Ser Thr Pro Ala  
245 250 255

Ala Val Thr Asn Arg Ile Lys Ala Leu Gly Thr Ser Gly Lys Val Thr  
260 265 270

Gly Ser Leu Ser Gly Ser Pro Asn Leu Val Ala Tyr Asn Gly Asn Gly  
275 280 285

Ala