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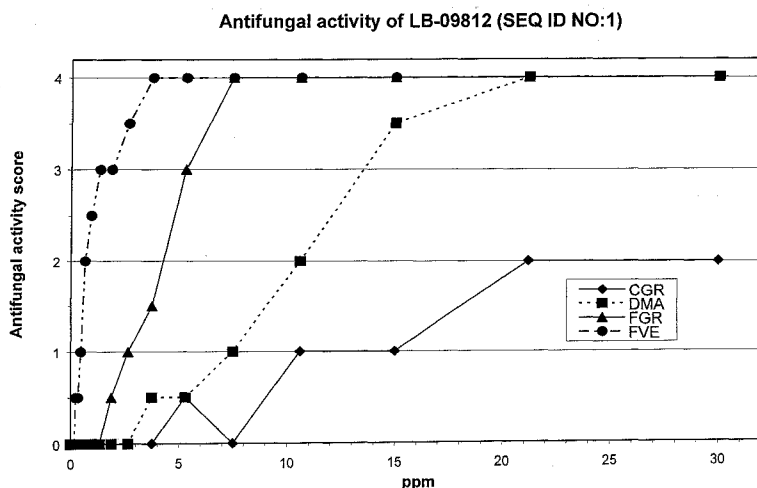
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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH,

[Continued on next page]

(54) **Title:** ANTIFUNGAL POLYPEPTIDES



(57) **Abstract:** Compositions and methods for protecting a plant from a pathogen, particularly a fungal pathogen, are provided. Compositions include amino acid sequences, and variants and fragments thereof, for antipathogenic polypeptides that were isolated from fungal fermentation broths. Nucleic acids that encode the antipathogenic polypeptides are also provided. A method for inducing pathogen resistance in a plant using the nucleotide sequences disclosed herein is further provided. The method comprises introducing into a plant an expression cassette comprising a promoter operably linked to a nucleotide sequence that encodes an antipathogenic polypeptide of the invention. Compositions comprising an antipathogenic polypeptide or a transformed microorganism comprising a nucleic acid of the invention in combination with a carrier and methods of using these compositions to protect a plant from a pathogen are further provided. Transformed plants, plant cells, seeds, and microorganisms comprising a nucleotide sequence that encodes an antipathogenic polypeptide of the invention are also disclosed.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
INV. C12N15/82 C07K14/385

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C12N C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, BIOSIS, FSTA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GALGÓCZY LÁSZLÓ ET AL: "Sensitivity of different zygomycetes to the Penicillium chrysogenum antifungal protein (PAF)." JOURNAL OF BASIC MICROBIOLOGY 2005, vol. 45, no. 2, 2005, pages 136-141, XP002468059 ISSN: 0233-111X Abstract Tables 1 and 2	1-22
A	WO 2006/014316 A (PIONEER HI BRED INT [US]; E I DU PONT DE NEMOURS AND COM [US]; UNIV CA) 9 February 2006 (2006-02-09) Claims 1-22 Page 6 lines 9-18 ----- -/--	1-22

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

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Obel, Nicolai

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/068984

(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>DEWAN M ET AL.: "Occurrence of Species of Aspergillus and Penicillium in Roots of Wheat and Ryegrass and Their Effects on Root Rot Caused by Gaeumannomyces graminis var. Tritici" AUSTRALIAN JOURNAL OF BOTANY, vol. 36, 1988; pages 701-710, XP009100403 Abstract Page 709 lines 3-9 Table 2</p>	1-22
A	<p>HORVATH HENRIETTE ET AL: "Genetically engineered stem rust resistance in barley using the Rpg1 gene" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE, WASHINGTON, DC, US, vol. 100, no. 1, 7 January 2003 (2003-01-07), pages 364-369, XP002336556 ISSN: 0027-8424 cited in the application the whole document</p>	1-22
A	<p>THEIS T ET AL: "New insights into the target site and mode of action of the antifungal protein of Aspergillus giganteus" RESEARCH IN MICROBIOLOGY, ELSEVIER, AMSTERDAM, NL, vol. 156, no. 1, January 2005 (2005-01), pages 47-56, XP004703703 ISSN: 0923-2508 the whole document</p>	1-22
A	<p>LEITER EVA ET AL: "Antifungal protein PAF severely affects the integrity of the plasma membrane of Aspergillus nidulans and induces an apoptosis-like phenotype" ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, vol. 49, no. 6, June 2005 (2005-06), pages 2445-2453, XP002468060 ISSN: 0066-4804 the whole document</p>	1-22
A	<p>YUEN G Y SCHROTH M N: "Interactions of pseudomonas fluorescens strain E6 with ornamental plants and its effect on the composition of root-colonizing microflora" PHYTOPATHOLOGY, ST. PAUL, MN, US, vol. 76, no. 2, 1 January 1986 (1986-01-01), pages 176-180, XP002959948 ISSN: 0031-949X Abstract</p>	1-22

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/068984

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A.	<p>REBOUX ET AL: "Mycotoxines : effets sur la sante et interactions avec d'autres composants organiques" REVUE FRANCAISE D'ALLERGOLOGIE ET D'IMMUNOLOGIE CLINIQUE, PARIS, FR, vol. 46, no. 3, 1 April 2006 (2006-04-01), pages 208-212, XP005362805 ISSN: 0335-7457 Table 2</p>	1-22

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/068984

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-22(partial)

With regard to SEQ ID NO 1

2. claims: 1-22 (partial)

With regard to SEQ ID NO 3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006014316 A	09-02-2006	AR 049570 A1	16-08-2006
		AU 2005270059 A1	09-02-2006
		BR PI0512920 A	15-04-2008
		CA 2571369 A1	09-02-2006
		EP 1763536 A1	21-03-2007