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14 February 2008

(54) Title: COMPOSITIONS FOR SILENCING THE EXPRESSION OF GIBBERELLIN 2-OXIDASE AND USES THEREOF

(57) Abstract: The present invention provides an isolated nucleic acid sequence encoding gibberellin 2-oxidase enzyme (GA 2-oxidase) of *Hibiscus cannabinus*. Furthermore, the present invention provides methods of silencing the expression of GA 2-oxidase gene via RNA interference for increasing fibers in plants, in particular in kenaf.



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# INTERNATIONAL SEARCH REPORT

International application No  
PCT/IL2007/000629

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. A01H5/00 A01H5/10 A01H5/04 C12N5/14 C12N15/82  
C12N9/02

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

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, Sequence Search

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/060080 A1 (TANAKA HIROSHI [JP] ET AL) 25 March 2004 (2004-03-25) pages 6-7; claims 5,10,22; example 1 -----	1-66
X	WO 00/09722 A (MONSANTO CO [US]; BROWN SHERRI M [US]; ELICH TEDD D [US]; HECK GREGORY) 24 February 2000 (2000-02-24) page 6; claim 45; example 14; sequences 67-69 pages 71-72 ----- -/--	1-66

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.
- \*Z\* document member of the same patent family

Date of the actual completion of the international search

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21/12/2007

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## INTERNATIONAL SEARCH REPORT

International application No

PCT/IL2007/000629

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>US 2002/053095 A1 (BROWN SHERRI M [US] ET AL BROWN SHERRI M [US] ET AL)  2 May 2002 (2002-05-02)  cited in the application  examples 10,13-16; sequences 41, 65, 67  page 6  pages 31-32  pages 34-35</p>	1-66
X	<p>-----  THOMAS ET AL: "Molecular cloning and functional expression of gibberellin 2-oxidases, multifunctional enzymes involved in gibberellin deactivation"  PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE, WASHINGTON, DC, US,  vol. 96, April 1999 (1999-04), pages 4698-4703, XP002124383  ISSN: 0027-8424  cited in the application  the whole document</p>	1-66
A	<p>-----  HEDDEN P ET AL: "Gibberellin metabolism: New insights revealed by the genes"  TRENDS IN PLANT SCIENCE, ELSEVIER SCIENCE, OXFORD, GB,  vol. 5, no. 12, December 2000 (2000-12), pages 523-530, XP002285953  ISSN: 1360-1385  the whole document</p>	1-66

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IL2007/000629

## 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: complete 1-43, 48, 49, 58-66, and partially 44-47, 53-57

DNA and amino acid sequences encoding gibberellin 2-oxidase (GA 2-oxidase) of *Hibiscus cannabinus* (also known as kenaf), double stranded RNA molecule that down-regulates expression of the GA 2-oxidase gene of kenaf, plant or plant cell transformed with said RNA molecule, methods for producing transgenic plants comprising said RNA molecule, DNA construct for generating said RNA molecule, antisense oligonucleotide targeted to a region of SEQ ID NO.3 coding for kenaf GA 2-oxidase, nucleotide sequence encoding a ribozyme capable of cleaving an RNA sequence defined by SEQ ID NO.1 encoding kenaf GA 2-oxidase, method for producing transgenic kenaf plant having reduced expression of a GA 2-oxidase gene

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2. claims: complete 50, and partially 44-47, 53-57

method for producing transgenic *Arabidopsis* plant having reduced expression of a GA 2-oxidase gene by introducing into at least one plant cell a DNA construct designed for generating siRNAs targeted to the GA 2-oxidase of the plant

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3. claims: complete 51, and partially 44-47, 53-57

method for producing transgenic tobacco plant having reduced expression of a GA 2-oxidase gene by introducing into at least one plant cell a DNA construct designed for generating siRNAs targeted to the GA 2-oxidase of the plant

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4. claims: complete 52, and partially 44-47, 53-57

method for producing transgenic tomato plant having reduced expression of a GA 2-oxidase gene by introducing into at least one plant cell a DNA construct designed for generating siRNAs targeted to the GA 2-oxidase of the plant

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No

PCT/IL2007/000629

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2004060080	A1	25-03-2004	CA 2422599 A1	20-03-2004
			JP 3783777 B2	07-06-2006
			JP 2004105154 A	08-04-2004
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WO 0009722	A	24-02-2000	AR 032578 A1	19-11-2003
			AU 5346099 A	06-03-2000
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US 2002053095	A1	02-05-2002	US 2003233679 A1	18-12-2003
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