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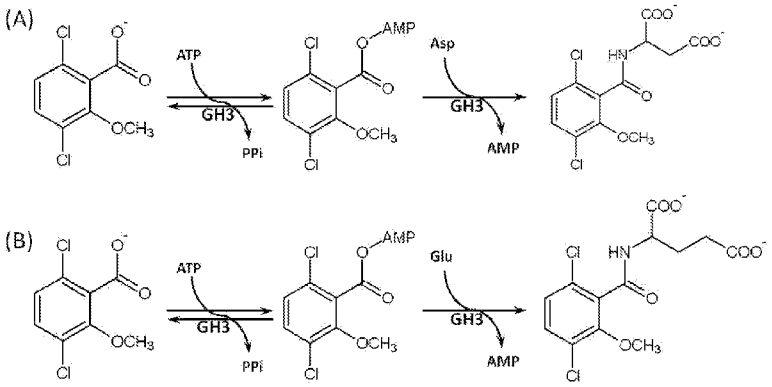
— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

— *with sequence listing part of description (Rule 5.2(a))*

(88) Date of publication of the international search report:
4 September 2014

(54) Title: COMPOSITIONS AND METHODS FOR AUXIN-ANALOG CONJUGATION



(57) Abstract: Compositions and methods are provided to detoxify an auxin-analog herbicide through the use of at least one GH3 polypeptide having amino acid/auxin analog herbicide conjugation activity. Such GH3 polypeptides in the presence of an auxin-analog herbicide will produce an amino acid/auxin-analog conjugate having reduced herbicidal activity. Various methods of employing the GH3 polypeptides and the polynucleotides encoding the same are provided. Such methods include methods to detoxify an auxin-analog herbicide comprising applying to a plant, a plant cell or a seed an auxin-analog herbicide, wherein the plant, plant cell or seed comprises a heterologous polynucleotide encoding a GH3 polypeptide, and expression of the GH3 polypeptide produces a non-herbicidal aspartate/auxin-analog conjugate or a glutamate/auxin-analog conjugate. Additional methods for controlling at least one weed in an area of cultivation comprising a crop or a seed of the crop are provided, as are methods of detoxifying a contaminated material having an auxin-analog herbicide.

WO 2014/100525 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/076771

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12N15/82
ADD.

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 practicable, search terms used)
EPO-Internal, BIOSIS, EMBASE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	STASWICK PAUL E ET AL: "Characterization of an Arabidopsis enzyme family that conjugates amino acids to indole-3-acetic acid", PLANT CELL, vol. 17, no. 2, February 2005 (2005-02), pages 616-627, XP002722178, ISSN: 1040-4651 the whole document	1,6-8,17

X	WO 2008/141154 A2 (DOW AGROSCIENCES LLC [US]; LIRA JUSTIN M [US]; SNODDERLEY ERIKA MEGAN) 20 November 2008 (2008-11-20)	2,4,9-20
A	the whole document	1,3

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[X] Further documents are listed in the continuation of Box C.

[X] 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 application or patent 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

Date of the actual completion of the international search	Date of mailing of the international search report
26 March 2014	26/06/2014

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Oderwald, Harald

2

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/076771

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 all searchable 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.:

1-21

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.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/076771

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007/146706 A2 (MONSANTO TECHNOLOGY LLC [US]; UNIV NEBRASKA [US]; CLEMENTE THOMAS E [U) 21 December 2007 (2007-12-21)	2
A	the whole document	1,3,9,21

A	DING XINHUA ET AL: "Activation of the indole-3-acetic acid-amido synthetase GH3-8 suppresses expansin expression and promotes salicylate- and jasmonate-independent basal immunity in rice", PLANT CELL, vol. 20, no. 1, January 2008 (2008-01), pages 228-240, XP002722179, ISSN: 1040-4651 the whole document	1

A	DU HAO ET AL: "A GH3 family member, OsGH3-2, modulates auxin and abscisic acid levels and differentially affects drought and cold tolerance in rice", JOURNAL OF EXPERIMENTAL BOTANY, vol. 63, no. 18, November 2012 (2012-11), pages 6467-6480, XP002722180, the whole document	1

2

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2013/076771

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2008141154 A2	20-11-2008	AR 066520 A1	26-08-2009
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		US 2008015110 A1	17-01-2008
		WO 2007146706 A2	21-12-2007

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-21

   Method to detoxify an auxin-analog herbicide and methods for controlling at least one weed in an area of cultivation using plants comprising a heterologous polynucleotide encoding a GH3 polypeptide having amino acid/auxin analog conjugating activity.

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2. claims: 22-25

   Method for testing a plant response to one or more compounds.
