



(51) International Patent Classification:

C12N 9/18 (2006.01) *C12N 15/80* (2006.01)
A23K 1/165 (2006.01) *C12R 1/885* (2006.01)

(21) International Application Number:

PCT/IB2012/050711

(22) International Filing Date:

16 February 2012 (16.02.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/445,657 23 February 2011 (23.02.2011) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

Published:

- 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 April 2013

(54) Title: METHOD FOR PRODUCING RECOMBINANT ENZYMES CAPABLE OF HYDROLYSING CHLOROPHYLL A CHLOROPHYLL DERIVATIVE

(57) Abstract: In one aspect there is provided a method for producing a recombinant enzyme capable of hydrolysing chlorophyll or a chlorophyll derivative, comprising a step of intracellular expression of the recombinant enzyme in a eukaryotic host cell.



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2012/050711

A. CLASSIFICATION OF SUBJECT MATTER

INV. C12N9/18 A23K1/165 C12N15/80 C12R1/885
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 A23K C12Y C12R

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, WPI Data, BIOSIS, Sequence Search, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/009676 A2 (DIVERSA CORP [US]; LAM DAVID [US]; WEINER DAVID [US]; HITCHMAN TIMOTHY) 26 January 2006 (2006-01-26) cited in the application	1,2,4-15
Y	abstract page 7, line 32 - page 8, line 12 page 11, line 30 - line 34 page 13, line 31 - page 14, line 2 page 26, line 1 - line 15 page 27, line 6 - line 10 page 48, line 24 - line 34 page 51, line 12 - line 20 page 111, line 23 - page 112, line 3 page 150, line 5 - page 152, line 10 sequences 22, 24, 27 ----- -/--	3



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 application or patent but published on or after the international filing date

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"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

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"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

4 December 2012

Date of mailing of the international search report

01/02/2013

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2012/050711

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 02/29022 A2 (DU PONT [US]; CAHOON EDGAR B [US]; CAHOON REBECCA E [US]; THORPE CATHE) 11 April 2002 (2002-04-11) cited in the application abstract page 2, line 19 - page 3, line 7 page 16, line 7 - line 18 page 17, line 31 - page 18, line 3 examples 4, 5 sequences 4, 12, 19, 22, 301	1,4-12, 14,15
X	WO 2008/122980 A2 (EVOGENE LTD [IL]; EMMANUEL EYAL [IL]; RONEN GIL [IL]; SAVIR NOA [IL]) 16 October 2008 (2008-10-16) abstract claims 3-7	10-12, 14,15
X	----- DATABASE UniProt [Online] 1 March 2003 (2003-03-01), Chen et al.: "Chlorophyllase 2. Brassica oleracea", XP002675158, retrieved from EBI Database accession no. Q8GTM3 the whole document	14,15
Y	----- UUSITALO J M ET AL: "ENZYME PRODUCTION BY RECOMBINANT TRICHODERMA REESEI STRAINS", JOURNAL OF BIOTECHNOLOGY, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL, vol. 17, 1 January 1991 (1991-01-01), pages 35-50, XP002988583, ISSN: 0168-1656, DOI: 10.1016/0168-1656(91)90025-Q abstract page 37, line 6 - line 9 page 46, line 23 - line 34	1-13
X	----- WO 2010/143149 A2 (DANISCO [DK]; SOEE JOERN BORCH [DK]; POULSEN CHARLOTTE HORMANS [DK];) 16 December 2010 (2010-12-16) abstract page 3, line 28 - page 4, line 15 page 15, line 15 - line 22 page 18, line 5 - line 8 examples 1, 7, 8 sequence 21 ----- -/--	1-15

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2012/050711

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ARKUS K A J ET AL: "Mechanistic analysis of wheat chlorophyllase", ARCHIVES OF BIOCHEMISTRY AND BIOPHYSICS, ACADEMIC PRESS, US, vol. 438, no. 2, 15 June 2005 (2005-06-15), pages 146-155, XP027195522, ISSN: 0003-9861 [retrieved on 2005-06-04]	14,15
Y	abstract Bacterial expression and purification of wheat chlorophyllase.; page 147, right-hand column figure 2 -----	1-13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2012/050711

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.:
1-15(partially)
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: 1-15(partially)

A method for producing a recombinant enzyme comprising a polypeptide sequence as defined in SEQ ID NO: 1 or functional fragment or variant thereof having at least 75% identity to SEQ ID NO: 1. An eukaryotic expression vector comprising the nucleic acid sequence defined in SEQ ID NO. 19 or functional fragment or variant thereof having at least 75% sequence identity to SEQ ID NO: 19. An eukaryotic host cell comprising such an expression vector. A recombinant enzyme capable of hydrolysing chlorophyll or a chlorophyll derivative comprising SEQ ID NO: 1 or a functional fragment or variant thereof having at least 75% sequence identity to SEQ ID NO: 1.

2-18. claims: 1-15(partially)

Idem invention 1 but with a polypeptide having a sequence as defined in SEQ ID NO: 2-18 and a corresponding polynucleotide having a sequence as defined in SEQ ID NO: 20-35.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2012/050711

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006009676 A2	26-01-2006	AU 2005264938 A1 BR PI0510939 A CA 2570872 A1 CN 101432292 A EA 200700032 A1 EP 1791853 A2 EP 2468853 A1 JP 2008505619 A WO 2006009676 A2	26-01-2006 17-07-2007 26-01-2006 13-05-2009 29-08-2008 06-06-2007 27-06-2012 28-02-2008 26-01-2006
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