



(51) International Patent Classification:

C12N 1/21 (2006.01) *C12P 7/06* (2006.01)
C12N 15/74 (2006.01) *A01H 5/00* (2006.01)
C12N 15/52 (2006.01) *C12N 9/42* (2006.01)

(21) International Application Number:

PCT/US2012/022800

(22) International Filing Date:

26 January 2012 (26.01.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/436,575	26 January 2011 (26.01.2011)	US
61/442,120	11 February 2011 (11.02.2011)	US
13/270,166	10 October 2011 (10.10.2011)	US

(71) Applicant (for all designated States except US): **QTER-OS, INC.** [US/US]; 100 Campus Drive, 6th Floor, Marlborough, MA 01752 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **O'MULLAN, Patrick** [US/US]; 17 Brookmeadow Lane, South Grafton, MA 01560 (US). **PATEL, Jase** [US/US]; 1444 Commonwealth Avenue, Apt. 15, Brighton, MA 02135 (US). **SCHMALISCH, Matthias** [DE/US]; 22 Commonwealth Avneue, Marlborough, MA 01721 (US). **WOLNER, Branden** [US/US]; 20 Field Street, Auburn, MA 01501 (US). **REEDER, Philippa** [US/US]; 118 Lowell Street, Arlington, MA 02474 (US). **ALI, Muhammad Abdul** [US/US]; 20 Fahey Street, Marlborough, MA 01752 (US).

(74) Agents: **VAN GOOR, David, W.** et al.; Wilson Sonsini Goodrich & Rosati, 650 Page Mill Road, Palo Alto, CA 94304-1050 (US).

(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).

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:

6 December 2012

(54) Title: BIOCATALYSTS SYNTHESIZING DEREGULATED CELLULASES

(57) Abstract: Provided are isolated novel *Clostridium phytofermentans* biocatalysts with deregulated cellulase activity that produce high yields of products. Further provided are methods of using the biocatalysts to degrade organic material and for use in industrial processes.



WO 2012/103385 A3

A. CLASSIFICATION OF SUBJECT MATTER

C12N 1/21(2006.01)i, C12N 15/74(2006.01)i, C12N 15/52(2006.01)i, C12P 7/06(2006.01)i, A01H 5/00(2006.01)i, C12N 9/42(2006.01)i

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 1/21; C07H 21/04; C12N 15/55; C12P 7/10; C12N 15/09; C12N 15/80; C12N 1/14; C12N 15/11; C12P 7/02; C12N 1/19; C12N 15/00; C12P 7/06

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

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: microorganism, cellulase, biomass, inhibitor, glucose, Clostridium, propionyl CoA carboxylase, two component AraC family transcriptional regulator, ROK family glucokinase, etc.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2010-0317087 A1 (PATRICK ST-PIERRE et al.) 16 December 2010 See claim 18; paragraph 0042.	183, 184 1-182, 185-189
A	US 05079154 A (SUSUMU ITO et al.) 07 January 1992 See the whole document.	1-189
A	US 06015703 A (THERESA C. WHITE and CHRISTOPHER D. HINDLE) 18 January 2000 See the whole document.	1-189
A	US 2010-0028966 A1 (JEFFREY BLANCHARD et al.) 04 February 2010 See the whole document.	1-189
A	KR 10-2009-0098419 A (INHA-INDUSTRY PARTNERSHIP INSTITUTE) 17 September 2009 See the whole document.	1-189
PA	US 2011-0269201 A1 (KEVIN GRAY and PATRICK O`MULLAN) 03 November 2011 See the whole document.	1-189
PA	WO 2011-106576 A2 (QTEROS, INC.) 01 September 2011 See the whole document.	1-189

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

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of 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

28 SEPTEMBER 2012 (28.09.2012)

Date of mailing of the international search report

28 SEPTEMBER 2012 (28.09.2012)

Name and mailing address of the ISA/KR



Korean Intellectual Property Office
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Heo, Joo-Hyung

Telephone No. 82-42-481-8150



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/022800

Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of :

a. a sequence listing filed or furnished

- on paper
- in electronic form

b. time of filing or furnishing

- contained in the international application as filed
- filed together with the international application in electronic form
- furnished subsequently to this Authority for the purposes of search

2. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/022800

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0317087 A1	16.12.2010	AU 2007-291864 A1	06.03.2008
		CA 2666741 A1	06.03.2008
		CN 101528929 A	09.09.2009
		EP 2057269 A1	13.05.2009
		JP 2010-501189 A	21.01.2010
		US 2008-0076152 A1	27.03.2008
		US 7785854 B2	31.08.2010
		US 8101398 B2	24.01.2012
		WO 2008-025164 A1	06.03.2008
US 05079154 A	07.01.1992	EP 0337009 B1	31.08.1994
		JP 01-222771 A	06.09.1989
		JP 2879682 B2	05.04.1999
US 06015703 A	18.01.2000	AU 1999-27072 B2	09.01.2003
		AU 2000-69744 A1	10.04.2001
		CA 2382609 A1	15.03.2001
		CN 1268737 C0	09.08.2006
		CN 1310756 A0	29.08.2001
		CN 1390260 A0	08.01.2003
		EP 1070117 B1	11.05.2005
		EP 1214431 A1	19.06.2002
		JP 2002-506616 A	05.03.2002
		US 6939704 B1	06.09.2005
		WO 01-18218 A1	15.03.2001
		WO 99-46362 A1	16.09.1999
		US 2010-0028966 A1	04.02.2010
CN 102224249 A	19.10.2011		
EP 2313513 A2	27.04.2011		
JP 2011-529345 A	08.12.2011		
US 2010-0035320 A1	11.02.2010		
US 7943363 B2	17.05.2011		
WO 2010-014631 A2	04.02.2010		
WO 2010-014632 A2	04.02.2010		
KR 10-2009-0098419 A	17.09.2009	None	
US 2011-0269201 A1	03.11.2011	WO 2011-137401 A2	03.11.2011
WO 2011-106576 A2	01.09.2011	WO 2011-106576 A3	12.01.2012