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

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14 March 2013

(15) Information about Correction:
see Notice of 14 March 2013

(54) Title: POLYPEPTIDES HAVING CELLULOLYTIC ENHANCING ACTIVITY AND POLYNUCLEOTIDES ENCODING SAME

(57) Abstract: The present invention provides isolated polypeptides having cellulolytic enhancing activity and isolated polynucleotides encoding the polypeptides. The invention also provides nucleic acid constructs, vectors, and host cells comprising the polynucleotides as well as methods of producing and using the polypeptides.

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A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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)

IPC: C07K; C12N; C12P

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)

DWPI, SIPOABS, CPRSABS, WOTXT, USTXT, EPTXT, CNTXT, CNKI, MEDLINE and keywords: *Humicola insolens*, cellulolytic, GH61, glycosyl hydrolase family, glycosidase, etc.

GENBANK: sequence of SEQ ID NOs: 1-54

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Genbank Accession Number: XP_001227732, version XP_001227732.1, 09 Apr. 2008 (09.04.2008), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13

☒ 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 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
24 Jul. 2012 (24.07.2012)	**24 Jan. 2013 (24.01.2013)**
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer YANG, Zhenyu Telephone No. (86-10)62411097

Form PCT/ISA /210 (second sheet) (July 2009)

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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 extra 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 fee.

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.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Genbank Accession Number: XP_001227508, version XP_001227508.1, 09 Apr. 2008 (09.04.2008), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001905612, version XP_001905612.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001907679, version XP_001907679.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001907702, version XP_001907702.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001223687, version XP_001223687.1, 09 Apr. 2008 (09.04.2008), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_962644, version XP_962644.1, 10 Apr. 2008 (10.04.2008), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Genbank Accession Number: XP_001907637, version XP_001907637.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001906078, version XP_001906078.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001907069, version XP_001907069.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001903701, version XP_001903701.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001905728, version XP_001905728.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_965498, version XP_965498.1, 10 Apr. 2008 (10.04.2008), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Genbank Accession Number: XP_001907502, version XP_001907502.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001219904, version XP_001219904.1, 09 Apr. 2008 (09.04.2008), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001224181, version XP_001224181.1, 09 Apr. 2008 (09.04.2008), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: EAA30263, version EAA30263.1, 10 Sep. 2007 (10.09.2007), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001225249, version XP_001225249.1, 09 Apr. 2008 (09.04.2008), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001905203, version XP_001905203.1, 05 May. 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Genbank Accession Number: CAD21296, version CAD21296.1, 14 Nov. 2006 (14.11.2006), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001906795, version XP_001906795.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001906810, version XP_001906810.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001225930, version XP_001225930.1, 09 Apr. 2008 (09.04.2008), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001220412, version XP_001220412.1, 09 Apr. 2008 (09.04.2008), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001905623, version XP_001905623.1, 05 May. 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Genbank Accession Number: XP_003046131, version XP_003046131.1, 14 Aug. 2010 (14.08.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	Genbank Accession Number: XP_001905203, version XP_001905203.1, 05 May 2010 (05.05.2010), [retrieved on 24 Jul. 2012(24.07.2012)]. Retrieved from: GenPept database (www.ncbi.nlm.nih.gov).	
X	See the ORIGIN sequence	1-10, 14-18
A		11-13
	WO2004031378 A2 (NOVOZYMES AS) 15 Apr. 2004 (15.04.2004)	
X	page 10, lines 20-24, page 18, lines 25-35, page 23, lines 7-9, page 39, lines 5-7 of the description, claims 24-39, SEQ ID NO: 3 and 4	1-10, 14-18
A		11-13
	Schülein M. Enzymatic properties of cellulase from *Humicola insolens*. Journal of Biotechnology. 21 Jan. 1998 (21.01.1998), vol. 57, No. 1-3, pages 71-81	
A	abstract	1-18

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
WO2004031378 A2	15.04.2004	EP1549745 A2	06. 07.2005
		US7803590 B2	28. 09.2010
		EP1549745 B1	05. 01.2011
		DE60335640 D1	17. 02.2011
		WO2004031378 A3	06. 05.2004
		EP2302046 B1	04. 01.2012
		AU2003266941 A1	23. 04.2004
		US7273738 B2	25. 09.2007
		US2008032000 A1	07. 02.2008
		US2010093592 A1	15. 04.2010
		US2004180420 A1	16. 09.2004
		AU2003266941 A8	27. 10.2005
		EP2302046 A1	30. 03.2011
		US2012009300 A1	12. 01.2012

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INTERNATIONAL SEARCH REPORT

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PCT/CN2012/074673

A. CLASSIFICATION OF SUBJECT MATTER

C07K 14/37 (2006.01) i

C12N 9/42 (2006.01) i

C12N 15/56 (2006.01) i

C12N 15/63 (2006.01) i

C12N 5/10 (2006.01) i

C12P 19/14 (2006.01) i

Box No. III Observations where unity of invention is lacking

This Authority considers that there are 54 inventions covered by the claims 1-18 indicated as follows:

invention 1, claims 1-10 (partially) and 14-18 (partially), directed to an isolated polypeptide related to the mature polypeptide of SEQ ID NO: 2, and corresponding polynucleotide, recombinant host cell, transgenic plant, plant part or plant cell, mutant cell, dsRNA molecule, composition, and related methods;

invention 2, claims 1-10 (partially) and 14-18 (partially), directed to an isolated polypeptide related to the mature polypeptide of SEQ ID NO: 4, and corresponding polynucleotide, recombinant host cell, transgenic plant, plant part or plant cell, mutant cell, dsRNA molecule, composition, and related methods;

inventions 3-27, claims 1-10 (partially) and 14-18 (partially), respectively, directed to an isolated polypeptide related to the mature polypeptide of SEQ ID NO: 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52 or 54 and corresponding polynucleotide, recombinant host cell, transgenic plant, plant part or plant cell, mutant cell, dsRNA molecule, composition, and related methods;

invention 28, claims 11-13 (partially), directed to a polynucleotide encoding a signal peptide of GH61 comprising or consisting of amino acids 1 to 17 of SEQ ID NO: 2, and corresponding recombinant host cell, and related method;

invention 29, claims 11-13 (partially), directed to a polynucleotide encoding a signal peptide of GH61 comprising or consisting of amino acids 1 to 16 of SEQ ID NO: 4, and corresponding recombinant host cell, and related method;

inventions 30-54, claims 11-13 (partially), respectively, directed to a polynucleotide encoding other signal peptide defined in claim 11 and corresponding nucleic acid construct or expression vector, recombinant host cell, and related method.

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The document WO2004031378A2 discloses a mature GH61 polypeptide from *Humicola insolens* (page 10, lines 20-24, page 39, lines 5-7 of the description, SEQ ID NO: 4), a polynucleotide encoding the GH61 polypeptide (page 18, lines 25-35, SEQ ID NO: 3), and the signal peptide coding region of SEQ ID NO: 3 (page 23, lines 7-9 of the description, descriptive text of SEQ ID NO: 3). The cellulolytic enhancing activity of GH61 polypeptide is already known in the art (see for example, Harris PV *et al.* Stimulation of lignocellulosic biomass hydrolysis by proteins of glycoside hydrolase family 61: structure and function of a large enigmatic family. *Biochemistry* 49:3306-3316, and the patent applications cited by the present application in page 2 of the description). Therefore, the source species and the function of the 27 mature GH61 polypeptides in this application can not be considered as special technical features within the meaning of Rule 13.2 PCT.

Since the polynucleotide encoding a signal peptide of GH61 polypeptide and the mature GH61 polypeptide from *Humicola insolens* are disclosed by WO2004031378A2, they have no common special technical feature anymore, and can not be regarded as belonging to a single invention concept too.

The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 PCT.

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