

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
23 December 2010 (23.12.2010)

PCT

(10) International Publication Number
WO 2010/146331 A3

(51) International Patent Classification:
C12P 7/10 (2006.01) *C13K 1/04* (2006.01)

(21) International Application Number:
PCT/GB2010/001120

(22) International Filing Date:
8 June 2010 (08.06.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0910707.9 19 June 2009 (19.06.2009) GB

(71) Applicant (for all designated States except US): WEYLAND AS [NO/NO]; Espehaugen 25, N-5258 Blomsterdalen (NO).

(71) Applicant (for GB only): COCKBAIN, Julian [GB/GB]; 42 Southmoor Road, Oxford OX2 6RD (GB).

(72) Inventor; and

(75) Inventor/Applicant (for US only): WEYDAHL, Karl, Ragnar [NO/NO]; Weyland AS, Espehaugen 25, N-5258 Blomsterdalen (NO).

(74) Agent: COCKBAIN, Julian; Dehns, St. Bride's House, 10 Salisbury Square, London EC4Y 8JD (GB).

(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, RO, RS, RU, 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, 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, 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))

(88) Date of publication of the international search report:
6 October 2011

(54) Title: PROCESS FOR PRODUCTION OF SUGARS AND ALCOHOLS FROM A CELLULOSIC MATERIAL

(57) Abstract: The present invention relates to a process for producing alcohol from a cellulosic material, said process comprising: hydrolyzing said cellulosic material with an aqueous acid to produce a hydrolysate; extracting acid and water from said hydrolysate with a water-miscible organic extraction solvent to yield (a) a first aqueous acidic solution containing said extraction solvent and (b) a residue containing sugars; subjecting said residue to an oligosaccharide cleavage reaction to yield an aqueous solution of fermentable sugars; fermenting said fermentable sugars and distilling alcohol from the resulting fermented mixture; contacting said first aqueous acidic solution with a water-immiscible liquid lipophilic solvent to yield a second aqueous acid solution and a solvent mixture of said extraction solvent and said liquid solvent; separating said solvent mixture to yield extraction solvent for recycling; and separating from said second aqueous acid solution an aqueous acid for recycling.



WO 2010/146331 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2010/001120

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12P7/10 C13K1/04
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)
C12P C13K

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)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 608 245 A (GADDY JAMES L [US] ET AL) 26 August 1986 (1986-08-26) figure 1 columns 3-6 tables 1,2	1-9
Y	----- WO 02/02826 A1 (HELLAND KNUT [NO]; WEYDAHL KARL [NO]) 10 January 2002 (2002-01-10) page 1, line 33 - page 2, line 7 examples 2,7 page 10, lines 32-37 figure 1	1-9
Y	----- WO 2007/019505 A2 (DARTMOUTH COLLEGE [US]; ZHANG YI-HENG PERCIVAL [US]; LYND LEE R [US]) 15 February 2007 (2007-02-15) figure 1 paragraph [0019] - paragraph [0021] ----- -/--	1-9

☒ 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.

"&" document member of the same patent family

Date of the actual completion of the international search

17 August 2011

Date of mailing of the international search report

25/08/2011

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Grenouillat, N

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2010/001120

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 007 636 A (LIGHTNER GENE E [US]) 28 December 1999 (1999-12-28) figures 1,2	1-9
X,P	----- WO 2010/038021 A2 (WEYLAND AS [NO]; WEYDAHL KARL RAGNAR [NO]; COCKBAIN JULIAN [GB]) 8 April 2010 (2010-04-08) claims 1-5 page 5 page 10 figure 1 -----	1-4,7-9

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2010/001120

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4608245	A	26-08-1986	AT 88442 T 15-05-1993
		AU 584849 B2	01-06-1989
		AU 6414386 A	30-04-1987
		CA 1253668 A1	09-05-1989
		DE 3688310 D1	27-05-1993
		EP 0219136 A2	22-04-1987
		JP 62202806 A	07-09-1987
		NZ 217968 A	27-01-1989

WO 0202826	A1	10-01-2002	AU 6643401 A 14-01-2002
		NO 20003448 A	07-01-2002

WO 2007019505	A2	15-02-2007	US 2009017503 A1 15-01-2009

US 6007636	A	28-12-1999	NONE

WO 2010038021	A2	08-04-2010	AU 2009299661 A1 08-04-2010
		EP 2344653 A2	20-07-2011
