

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
27 December 2001 (27.12.2001)

PCT

(10) International Publication Number
WO 01/98521 A3

(51) International Patent Classification⁷: C12P 7/44, 7/40

(21) International Application Number: PCT/US01/19612

(22) International Filing Date: 20 June 2001 (20.06.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/213,326 22 June 2000 (22.06.2000) US
09/884,688 19 June 2001 (19.06.2001) US

(71) Applicant: COGNIS CORPORATION [US/US]; 2500 Renaissance Blvd., Suite 200, Gulph Mills, PA 19406 (US).

(72) Inventor: STALEY, Michael, D.; 10541 Lemarie Drive, Cincinnati, OH 25241 (US).

(74) Agents: STEEN, Jeffrey, S. et al.; Dilworth & Barrese, LLP, 333 Earle Ovington Blvd., Uniondale, NY 11553 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
21 March 2002

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ISOLATION OF CARBOXYLIC ACIDS FROM FERMENTATION BROTH

(57) Abstract: A process for recovering carboxylic acids from an aqueous mixture such as a fermentation broth using a solvent containing at least one olefin without the need for first removing the spent microorganism cells is provided A co-solvent which increases the partition coefficient of the solvent relative to the carboxylic acid may optionally be included.

WO 01/98521 A3

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/19612

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12P7/44 C12P7/40

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 7 C12P C07C

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)

EPO-Internal, WPI Data, PAJ, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 00 20620 A (HENKEL CORP) 13 April 2000 (2000-04-13) the whole document ---	1,3,4, 10-21, 23,24, 30-38
A	US 5 412 126 A (KING C JUDSON ET AL) 2 May 1995 (1995-05-02) column 4, line 18 -column 5, line 35 column 6, line 25 -column 7, line 5 column 9, line 48 -column 10, line 61 column 11, line 65 -column 12, line 47 claim 9 --- -/--	20,21, 23,24

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in 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

19 December 2001

Date of mailing of the international search report

11/01/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

van de Kamp, M

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/19612

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 104 492 A (KING C JUDSON ET AL) 14 April 1992 (1992-04-14) column 2, line 65 -column 3, line 34 column 5, line 30 -column 6, line 47 examples 1-3,5,6 ---	20,21, 23,24
A	US 3 859 175 A (OHRUI TETSUYA ET AL) 7 January 1975 (1975-01-07) column 1, line 32-37 column 4, line 37,38 claim 1 ---	20,22
A	WO 00 20566 A (MADDURI KRISHNA M ;CRAFT DAVID L (US); HENKEL CORP (US); CORNETT C) 13 April 2000 (2000-04-13) cited in the application example 12 ---	1
A	WO 00 17380 A (GEN ELECTRIC) 30 March 2000 (2000-03-30) example 7 ---	1
P,A	WO 01 10808 A (COGNIS CORP) 15 February 2001 (2001-02-15) page 1, line 27 -page 3, line 24 examples 3-5 claims 1-3,6-11 ---	1,2,8,9, 19-22, 28,29
P,A	DATABASE WPI Section Ch, Week 200147 Derwent Publications Ltd., London, GB; Class D16, AN 2001-433248 XP002186157 & CN 1 289 757 A (CHINA PETRO-CHEM CORP), 4 April 2001 (2001-04-04) abstract -----	1,19-21

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. l. Application No

PCT/US 01/19612

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0020620	A	13-04-2000	AU 6387199 A WO 0020620 A2	26-04-2000 13-04-2000
US 5412126	A	02-05-1995	NONE	
US 5104492	A	14-04-1992	NONE	
US 3859175	A	07-01-1975	JP 1033801 C JP 49007216 A JP 55022462 B JP 1018418 C JP 49007218 A JP 55006623 B DE 2326327 A1 FR 2185607 A1 GB 1427223 A NL 7307014 A , B,	20-02-1981 22-01-1974 17-06-1980 28-10-1980 22-01-1974 18-02-1980 06-12-1973 04-01-1974 10-03-1976 27-11-1973
WO 0020566	A	13-04-2000	AU 5917799 A EP 1148130 A2 EP 1148131 A2 EP 1148132 A2 EP 1162268 A2 EP 1148133 A2 EP 1148134 A2 EP 1148135 A2 EP 1148136 A2 EP 1148137 A2 EP 1148143 A2 EP 1148138 A2 EP 1135506 A2 WO 0020566 A2	26-04-2000 24-10-2001 24-10-2001 24-10-2001 12-12-2001 24-10-2001 24-10-2001 24-10-2001 24-10-2001 24-10-2001 24-10-2001 24-10-2001 26-09-2001 13-04-2000
WO 0017380	A	30-03-2000	US 6066480 A WO 0017380 A1	23-05-2000 30-03-2000
WO 0110808	A	15-02-2001	AU 6524200 A WO 0110808 A1	05-03-2001 15-02-2001
CN 1289757	A	04-04-2001	NONE	