

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
4 March 2010 (04.03.2010)

PCT

(10) International Publication Number  
**WO 2010/024924 A3**

(51) International Patent Classification:  
C12N 9/20 (2006.01) C12P 7/64 (2006.01)  
C12N 15/10 (2006.01)

(21) International Application Number:  
PCT/US2009/004904

(22) International Filing Date:  
28 August 2009 (28.08.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
12/202,204 29 August 2008 (29.08.2008) US

(71) Applicant (for all designated States except US): **BUNGE OILS, INC.** [US/US]; 11720 Borman Drive, St. Louis, MO 63146 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **DAYTON, Christopher, L., G.** [US/US]; 900 Peony Lane, Bourbonnais, IL 60914 (US). **BARTON, Nelson** [US/US]; 11005 Scripps Ranch Blvd., San Diego, CA 92131 (US). **BUENO, Ana-lia** [US/US]; 4498 Ocean View Boulevard, San Diego, CA 92113 (US). **CUENCA, Joslin, G.** [US/US]; 8847 Spectrum Center Blvd. #6116, San Diego, CA 92126 (US). **HITCHMAN, Tim** [GB/US]; 228 Melrose Avenue, Encinitas, CA 92024 (US). **KLINE, Katie, A.** [US/US]; 7469 Bookham Court, San Diego, CA 92111 (US). **LYON, Jonathan** [US/US]; 4470 Calle Mar de Armonia, San Diego, CA 92130 (US). **MILLER, Mark, L.** [US/US]; 1462 Moon Road, Vista, CA 92083 (US). **WALL, Mark, A.** [US/US]; 11671 Alderhill Terrace, San Diego, CA 92131 (US).

(74) Agents: **RIEGER, Dale, L.** et al.; Jones Day, 222 East 41st Street, New York, NY 10017-6702 (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, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (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))
- with sequence listing part of description (Rule 5.2(a))

(88) Date of publication of the international search report:  
29 April 2010

(54) Title: HYDROLASES, NUCLEIC ACIDS ENCODING THEM AND METHODS FOR MAKING AND USING THEM

(57) Abstract: Provided are hydrolases, including lipases, saturases, palmitases and/or stearatases, and polynucleotides encoding them, and methods of making and using these polynucleotides and polypeptides. Further provided are polypeptides, e.g., enzymes, having a hydrolase activity, e.g., lipases, saturases, palmitases and/or stearatases and methods for preparing low saturate or low trans fat oils, such as low saturate or low trans fat animal or vegetable oils, e.g., soy or canola oils.



WO 2010/024924 A3

**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/US2009/004904

**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. C12N9/20 C12N15/10 C12P7/64

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 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 practical, search terms used)  
 EPO-Internal, WPI Data, EMBASE, 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 2006/096834 A2 (DIVERSA CORP [US]; KEROVUO JANNE S [US]; MCCANN RYAN [US]; WEINER DAVI) 14 September 2006 (2006-09-14) abstract claims 1,4,5,7-14,18-20,52,55-65,68-71,105,106,12 9-134 claims 144-146,169-172,195-203,241,243-246 paragraph [0367] paragraph [0370] - paragraph [0377] paragraph [0423] - paragraph [0426] paragraph [0456] paragraph [0331] - paragraph [0335] -& DATABASE IBIS 3 April 2008 (2008-04-03), "Hydrolase enzyme encoding DNA SEQ ID NO: 923" XP002570173 Database accession no. AQZ64878 -/--	1-67

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	"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
"E" earlier document but published on or after the international filing date	"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
"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)	"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.
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search  24 February 2010	Date of mailing of the international search report  10/03/2010
---	--

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  Schröder, Gunnar
--	--

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2009/004904

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>-&amp; DATABASE IBIS 3 April 2008 (2008-04-03), "Hydrolase activity expressing peptide SEQ ID NO: 924." XP002570174 Database accession no. AQZ64879 -----</p> <p>SVENDSEN A: "Lipase protein engineering" BIOCHIMICA ET BIOPHYSICA ACTA. PROTEIN STRUCTURE AND MOLECULAR ENZYMOLOGY, ELSEVIER, AMSTERDAM; NL, vol. 1543, no. 2, 29 December 2000 (2000-12-29), pages 223-238, XP004279107 ISSN: 0167-4838 the whole document -----</p>	1-67
L	<p>SHU Z Y ET AL: "Technical methods to improve yield, activity and stability in the development of microbial lipases" JOURNAL OF MOLECULAR CATALYSIS. B, ENZYMATIC, ELSEVIER, AMSTERDAM, NL, vol. 62, no. 1, 2 January 2010 (2010-01-02), pages 1-8, XP026743040 ISSN: 1381-1177 [retrieved on 2009-09-10] abstract paragraphs [03.2], [ 3.5], [0 6.]; table 2 -----</p>	1-67

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/004904

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006096834 A2	14-09-2006	CA 2601472 A1	14-09-2006
		EP 1869173 A2	26-12-2007
		US 2009297495 A1	03-12-2009

---