

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
22 October 2009 (22.10.2009)

PCT

(10) International Publication Number  
**WO 2009/129320 A3**

- (51) International Patent Classification:  
A23J 1/12 (2006.01)      A23K 1/14 (2006.01)  
A23J 1/14 (2006.01)
- (21) International Application Number:  
PCT/US2009/040687
- (22) International Filing Date:  
15 April 2009 (15.04.2009)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
61/045,277      15 April 2008 (15.04.2008)      US
- (71) Applicants (for all designated States except US): **THE UNITED STATES OF AMERICA, AS REPRESENTED BY THE SECRETARY OF AGRICULTURE** [US/US]; 1400 Independence Ave. Sw, Washington, DC 20250-0302 (US). **MONTANA MICROBIAL PRODUCTS, INC.** [US/US]; 510 East Kent Ave., Missoula, MT 59801 (US). **THE REGENTS OF THE UNIVERSITY OF IDAHO** [US/US]; Office Of Technology Transfer, Morrill Hall 414, Po Box 443003, Moscow, ID 83844-3003 (US).

- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **BARROWS, Fred-eric, T.** [US/US]; Fish Technology Center, 4050 Bridger Canyon Rd., Bozeman, MT 59715 (US). **BRADLEY, Clifford, A.** [US/US]; 510 East Kent Ave., Missoula, MT 59801 (US). **KEARNS, Robert, D.** [US/US]; Po Box 130, Melrose, MT 59743 (US). **WASICEK, Brian, D.** [US/US]; 720 Sampson, Butte, MT 59701 (US). **HARDY, Ronald, W.** [US/US]; University Of Idaho, 3059f National Fish Hatchery Road, Hagerman, ID 83332 (US).
- (74) Agent: **PASSLER, Mark, D.**; Akerman Senterfitt, P. O. Box 3188, West Palm Beach, FL 33402-3188 (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, 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, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG,

[Continued on next page]

(54) Title: PROTEIN CONCENTRATE FROM STARCH CONTAINING GRAINS: COMPOSITION, METHOD OF MAKING, AND USES THEREOF

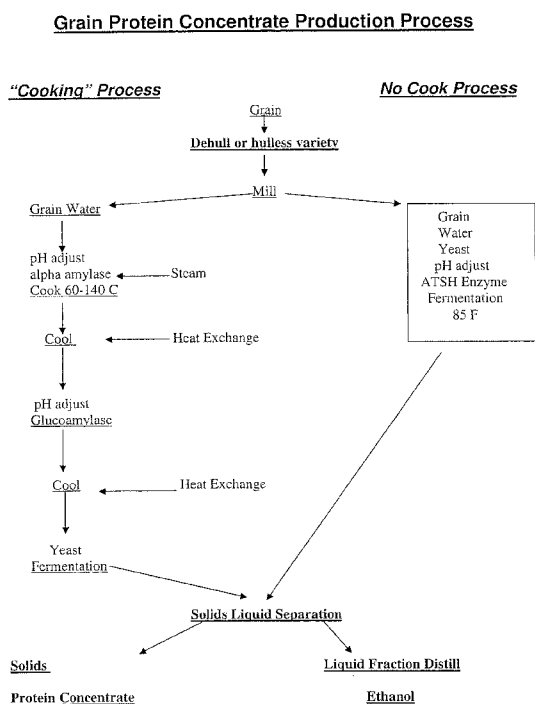


FIG. 2

(57) Abstract: The present invention relates to methods of producing a protein concentrate from a starch containing grain and uses thereof. In an exemplary embodiment, the protein concentrate produced is used to prepare an aquaculture feed.

WO 2009/129320 A3



SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA,  
UG, US, UZ, VC, VN, ZA, ZM, ZW.

**Published:**

- (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, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

- 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:**

23 December 2009

**A. CLASSIFICATION OF SUBJECT MATTER***A23J 1/12(2006.01)i, A23J 1/14(2006.01)i, A23K 1/14(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)

IPC A23C 11/00, A23J 1/12, A23J 3/00, A23L 1/10, C07K 14/415, C12P 21/06

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 since 1975

Japanese Utility models and applications for Utility models since 1975

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

eKOMPASS(KIPO internal) &amp; keyword: protein concentrate, starch, grain, oil seed, glucose, ethanol, barley, aquaculture, and Rhizopus

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003-180415 A1 (MICHAEL J. STIEFEL et al.) 25 Sep 2003	1-7, 11-13
Y	See the whole document, especially, abstract, figure 1, 2B, 3B, paragraphs 12, 24, 26, 50, 57,	8-10
A	claims 1-59	14-19
Y	US 2007-0172914 A1 (JOHANNIS CORNELIS SLABBEKOORN et al.) 26 Jul 2007	8-10
	See the whole document, especially, abstract, , paragraph 19, claims 1-33	
A	US 3,958,015 A (MAX M. GAY) 18 May 1976	1-19
	See the whole document	
A	US 2007-0092629 A1 (LAURIE SCANLIN et al.) 26 Apr 2007	1-19
	See the whole document	
A	US 4,990,344 A (JOHN R. EUBER et al.) 05 Feb 1991	1-19
	See the whole document	
A	WO 2005-082155 A2 (GENENCOR INTERNATIONAL, INC.) 09 Sep 2005	1-19
	See the whole document	

 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

"&amp;" document member of the same patent family


Date of the actual completion of the international search

04 NOVEMBER 2009 (04.11.2009)

Date of mailing of the international search report

**04 NOVEMBER 2009 (04.11.2009)**

Name and mailing address of the ISA/KR


 Korean Intellectual Property Office  
 Government Complex-Daejeon, 139 Seonsa-ro, Seo-  
 gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Chio Jun Ho

Telephone No. 82-42-481-5569



**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2009/040687**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003-180415 A1	25.09.2003	None	
US 2007-0172914 A1	26.07.2007	AR 047658 A1 WO 2005-074704 A1	01.02.2006 18.08.2005
US 03958015 A	18.05.1976	None	
US 2007-0092629 A1	26.04.2007	CA 2550694 A1 EP 1701687 A4 EP 1701687 A2 US 07563473 B2 WO 2005-058249 A2 WO 2005-058249 A3	30.06.2005 20.02.2008 20.09.2006 21.07.2009 30.06.2005 30.06.2005
US 04990344 A	05.02.1991	CA 2020831 C EP 0407981 A3 EP 0407981 A2 EP 0407981 B1 JP 3047113 B2 JP 03-049650 A	27.06.2000 13.03.1991 16.01.1991 05.01.1994 29.05.2000 04.03.1991
WO 2005-082155 A2	09.09.2005	CN 101123883 A CN 101123883 A0 EP 1715753 A2 EP 1715753 B1 JP 2007-531515 T JP 2007-531515 A WO 2005-082155 A3 WO 2005-082155 A3	13.02.2008 13.02.2008 02.11.2006 22.07.2009 08.11.2007 08.11.2007 07.06.2007 09.09.2005