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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))

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12 January 2012

(54) Title: COPOLYESTERS HAVING REPEAT UNITS DERIVED FROM ω -HYDROXY FATTY ACIDS

(57) Abstract: The present invention relates to aliphatic or aliphatic-aromatic polyesters and copolyesters comprised of biobased ω -hydroxyfatty acids or derivatives thereof, processes for the preparation thereof, and compositions thereof having improved properties. The copolyesters of the present invention may also contain additional components that can be selected from aliphatic or aromatic diacids, diols and hydroxyacids obtained from synthetic and natural sources. The biobased ω -hydroxyfatty acids that comprise the polyesters and copolyesters of the present invention are made using a fermentation process from pure fatty acids, fatty acid mixtures, pure fatty acid ester, mixtures of fatty acid esters, and triglycerides from various sources. The polyesters of the present invention may contain various amounts and types of ω -carboxyfatty acids depending on the engineered yeast strain used for the bioconversion as well as the feedstock(s) used.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/025086**A. CLASSIFICATION OF SUBJECT MATTER*****C08G 63/78(2006.01)i, C08G 63/85(2006.01)i, C08G 63/02(2006.01)i, C08L 67/02(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)

C08G 63/78; B29C 49/08; C08L 67/02; B01J 13/00; C08L 67/00; B01F 17/36; C08F 20/64; B32B 27/20; B32B 3/10; C08G 63/02; C12P 7/64; B32B 27/18

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)
eKOMPASS(KIPO internal), PAJ, USPTO, etc.**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2006-0111519 A1 (MARC STRAND et al.) 25 May 2006 See the whole document.	1-59,63-96
A	US 05863461 A (ANSMANN; ACHIM et al.) 26 January 1999 See the whole document.	1-59,63-96
A	US 2006-0094858 A1 (SAM TURNER et al.) 04 May 2006 See the whole document.	1-59,63-96
A	US 2009-0054610 A1 (GROSS RICHARD A. et al.) 26 February 2009 See the whole document.	1-59,63-96
A	US 7153569 B2 (ROSS THOMAS KAUFMAN et al.) 26 December 2006 See the whole document.	1-59,63-96
A	US 6551688 B2 (MOSKALA; ERIC JON et al.) 22 April 2003 See the whole document.	1-59,63-96

☐ 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

"&" document member of the same patent family

Date of the actual completion of the international search

22 NOVEMBER 2011 (22.11.2011)

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Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2011/025086**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.: 60-62
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:

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 fee, this Authority did not invite payment of any 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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2011/025086

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006-0111519 A1	25.05.2006	AT 390461 T	15.04.2008
		CN 101056938 A0	17.10.2007
		DE 602005005712 D1	08.05.2008
		DE 602005005712 T2	16.04.2009
		EP 1809702 A1	25.07.2007
		EP 1809702 B1	26.03.2008
		JP 2008-519899 A	12.06.2008
		JP 2008-519899 T	12.06.2008
		KR 10-2007-0084140 A	24.08.2007
		WO 2006-053232 A1	18.05.2006
US 05863461 A	26.01.1999	EP 0794832 A1	17.09.1997
		EP 0794832 A1	03.12.1997
		EP 0794832 B1	12.09.2001
		JP 10-510211 A	06.10.1998
		WO 96-16728 A1	06.06.1996
US 2006-0094858 A1	04.05.2006	CN 101052665 A0	10.10.2007
		EP 1805244 A1	11.07.2007
		JP 2008-518083 A	29.05.2008
		JP 2008-518083 T	29.05.2008
		WO 2006-049826 A1	11.05.2006
US 2009-0054610 A1	26.02.2009	CA 2734893 A1	25.02.2010
		EP 2324001 A1	25.05.2011
		WO 2010-022200 A1	25.02.2010
US 7153569 B2	26.12.2006	EP 1725607 A2	29.11.2006
		KR 10-2007-0015907 A	06.02.2007
		MX PA06010680 A	01.12.2006
		US 2005-0208291 A1	22.09.2005
		WO 2005-095515 A2	13.10.2005
		WO 2005-095515 A3	12.01.2006
		WO 2005-095515 A3	13.10.2005
US 6551688 B2	22.04.2003	AT 443732 T	15.10.2009
		BR 0207418 A	10.08.2004
		CN 100340593 C0	03.10.2007
		CN 1494567 A	05.05.2004
		DE 60233790 D1	05.11.2009
		EP 1392764 A1	03.03.2004
		EP 1392764 B1	23.09.2009
		JP 04-195297 B2	10.12.2008
		JP 2004-519539 A	02.07.2004
		JP 2004-519539 T	02.07.2004
		KR 10-0849265 B1	29.07.2008
		MX PA03007495 A	04.12.2003
		TW 592965 A	21.06.2004
		TW 592965 B	21.06.2004

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2011/025086

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2002-0188092 A1	12.12.2002
		WO 02-068513 A1	06.09.2002