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(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.

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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))*

— *with sequence listing part of description (Rule 5.2(a))*

(88) Date of publication of the international search report:
14 April 2011

(54) Title: NOVEL FATTY ACID ELONGATION COMPONENTS AND USES THEREOF

(57) Abstract: The invention provides isolated nucleic acid molecules which encodes a novel fatty acid nECR. The invention also provides recombinant expression vectors containing nECR nucleic acid molecules, host cells into which the expression vectors have been introduced, and methods for large-scale production of long chain polyunsaturated fatty acids (LCPUFAs), e.g., ARA, EPA and DHA.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/056936

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12N15/82 C12N9/02
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)
C12N

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, BIOSIS, Sequence Search, EMBASE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE UniProt [Online] 14 April 2009 (2009-04-14), Armbrust E.V. et al.: XP002606681, retrieved from UniProt accession no. B5YMG6 Database accession no. B5YMG6	1-3,5,7
Y	* abstract	4,6,8-15

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[X] Further documents are listed in the continuation of Box C.

[X] 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

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"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	Date of mailing of the international search report
11 January 2011	23/02/2011

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Montrone, Marco

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Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	ARMBRUST E VIRGINIA ET AL: "The genome of the diatom Thalassiosira pseudonana: ecology, evolution, and metabolism", SCIENCE, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, WASHINGTON, DC; US, vol. 306, no. 5693, 1 October 2004 (2004-10-01), pages 79-86, XP002559464, ISSN: 0036-8075 * abstract page 84, column 2, paragraph 2 - column 3, paragraph 1; figure 4 page 85, column 2, paragraph 4	4,6,8-15
Y	WO 2007/093776 A2 (BASF PLANT SCIENCE GMBH [DE]; NAPIER JOHNATHAN [GB]; SAYANOVA OLGA [GB]) 23 August 2007 (2007-08-23) * abstract page 1, lines 8-18 page 2, lines 37,38 page 3, lines 8-25 page 4, lines 4-11 page 15, lines 28-40	4,6,8-15
A	OHLROGGE J ET AL: "Lipid biosynthesis", PLANT CELL, AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS, ROCKVILLE, MD, US LNKD-DOI:10.1105/TPC.7.7.957, vol. 7, no. 7, 1 January 1995 (1995-01-01) , pages 957-970, XP002272818, ISSN: 1040-4651 * abstract figure 3	1-15
X	DATABASE UniProt [Online] 10 February 2009 (2009-02-10), "SubName: Full=Predicted protein;", XP002616143, retrieved from EBI accession no. UNIPROT:B7FVT1 Database accession no. B7FVT1	1-3,5,7
Y	* abstract; compound -& BOWLER CHRIS ET AL: "The Phaeodactylum genome reveals the evolutionary history of diatom genomes.", NATURE 13 NOV 2008 LNKD- PUBMED:18923393, vol. 456, no. 7219, 13 November 2008 (2008-11-13), pages 239-244, XP002616144, ISSN: 1476-4687 * abstract	4,6,8-15

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	WO 2009/133145 A1 (BASF PLANT SCIENCE GMBH [DE]; BAUER JOERG [DE]; NAPIER JOHNATHAN A [GB) 5 November 2009 (2009-11-05) * abstract page 5, lines 8-32 page 9, line 35 - page 10, line 4 page 26, lines 5-18 page 28, lines 17-21 page 30, lines 9,10 page 33, lines 20-25 page 42, lines 9-37 page 44, lines 3-12 page 46, lines 28-38 page 47, line 31 - page 48, line 2	4,6,8-15
A	WO 2007/106903 A2 (MARTEK BIOSCIENCES CORP [US]; METZ JAMES G [US]; KUNER JERRY M [US]; L) 20 September 2007 (2007-09-20) * abstract page 3, paragraph 4 - page 4, paragraph 4 page 63, paragraphs 3,4 page 127, paragraph 1	1-15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2010/056936

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.:
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:

see additional sheet

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 fees, this Authority did not invite payment of additional fees.

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-15(partially)

A polynucleotide comprising a nucleic acid sequence elected from the group consisting of:
a) a nucleic acid sequence having a nucleotide sequence as shown in SEQ ID NOs: 1;
b) a nucleic acid sequence encoding a polypeptide having an amino acid sequence as shown in SEQ ID NOs: 2;
c) a nucleic acid sequence being at least 50% identical to the nucleic acid sequence of a) or b), wherein said nucleic acid sequence encodes a polypeptide having nECR activity;
d) a nucleic acid sequence encoding a polypeptide having nECR activity and having an amino acid sequence which is at least 50% identical to the amino acid sequence of any one of a) to c); and
e) a nucleic acid sequence which is capable of hybridizing under stringent conditions to any one of a) to d), wherein said nucleic acid sequence encodes a polypeptide having nECR activity.

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2. claims: 1-15(partially)

A polynucleotide comprising a nucleic acid sequence elected from the group consisting of:
a) a nucleic acid sequence having a nucleotide sequence as shown in SEQ ID NOs: 3;
b) a nucleic acid sequence encoding a polypeptide having an amino acid sequence as shown in SEQ ID NOs: 4;
c) a nucleic acid sequence being at least 50% identical to the nucleic acid sequence of a) or b), wherein said nucleic acid sequence encodes a polypeptide having nECR activity;
d) a nucleic acid sequence encoding a polypeptide having nECR activity and having an amino acid sequence which is at least 50% identical to the amino acid sequence of any one of a) to c); and
e) a nucleic acid sequence which is capable of hybridizing under stringent conditions to any one of a) to d), wherein said nucleic acid sequence encodes a polypeptide having nECR activity.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2010/056936

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007093776 A2	23-08-2007	AR 059554 A1	09-04-2008
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