



(43) International Publication Date
1 May 2014 (01.05.2014)

(10) International Publication Number
WO 2014/063985 A3

(51) International Patent Classification:

A23L 1/305 (2006.01) A61K 9/127 (2006.01)
A23L 1/00 (2006.01) A61K 9/51 (2006.01)
A61K 9/107 (2006.01)

(21) International Application Number:

PCT/EP2013/071708

(22) International Filing Date:

17 October 2013 (17.10.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/718,523 25 October 2012 (25.10.2012) US
61/836,754 19 June 2013 (19.06.2013) US

(71) Applicant: NESTEC S.A. [CH/CH]; Avenue Nestlé, 55,
CH-1800 Vevey (CH).

(72) Inventors: SOUSSAN, Elodie; Neufeldstrasse 120, CH-
3012 Bern (CH). MAYNARD, Françoise; Balsigerrain 28,
CH-3095 Spiegel bei Bern (CH).

(74) Agent: STEPHEN, Paula-Marie; CT-IAM, Avenue
Nestlé, 55, CH-1800 Vevey (CH).

(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, BN, 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, IR, IS, JP, KE, KG, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
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.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, 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, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a
patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the
earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

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))

(88) Date of publication of the international search report:

31 July 2014

(54) Title: ENCAPSULATED BITTER PEPTIDES, METHODS OF ENCAPSULATING BITTER PEPTIDES, AND NUTRI-
TIONAL COMPOSITIONS INCLUDING ENCAPSULATED BITTER PEPTIDES

(57) Abstract: Encapsulated bitter peptides, methods of encapsulating bitter peptides, and nutritional compositions including encap-
sulated bitter peptides are provided. The bitter peptides can be encapsulated in a hydrophobic matrix, such as an organogel, a solid
lipid nanoparticle, a liposome or combinations thereof. The encapsulated bitter peptides can be bioavailable, can be selectively en-
capsulated such that peptides needed for emulsion stabilization are not encapsulated and can maintain encapsulation during further
processing such as heat treatment and homogenization.



WO 2014/063985 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/071708

A. CLASSIFICATION OF SUBJECT MATTER		
INV. A23L1/305	A23L1/00	A61K9/107 A61K9/127 A61K9/51
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) A23L A61K		
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) EPO-Internal, BIOSIS, FSTA, WPI Data, EMBASE		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2010/039036 A1 (FRIESLAND BRANDS BV [NL]; VOS HENDRIK [NL]; POORTINGA ALBERT THIJIS [NL] 8 April 2010 (2010-04-08) page 2, line 19 - line 27 page 12, line 16 - line 18 -----	1,2,5,6, 11-14
A	WO 2008/130236 A2 (NUTRICIA NV [NL]; HOTRUM NATALIE ELIZABETH [NL]; BUIJSSE CARLA ANGELE) 30 October 2008 (2008-10-30) page 1, line 18 - page 2, line 7 page 3, line 25 - line 35 page 6, line 31 - page 7, line 15 examples 2,3 -----	1,2,5,6, 11-14
A	EP 1 897 451 A1 (SHS INTERNAT LTD [GB]) 12 March 2008 (2008-03-12) paragraph [0012] - paragraph [0013] paragraphs [0025], [0041], [0051] ----- -/-	1,2,5,6, 11-14
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 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 10 February 2014		Date of mailing of the international search report 16/06/2014
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 Vermeulen, Stéphane

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2013/071708

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>DATABASE WPI Week 199018 Thomson Scientific, London, GB; AN 1990-135523 XP002720004, & JP H02 83031 A (LION CORP) 23 March 1990 (1990-03-23) abstract</p> <p>-----</p>	1,2,5,6, 11-14
A	<p>US 2009/053290 A1 (SAND BRUCE J [US] ET AL) 26 February 2009 (2009-02-26) paragraph [0053] - paragraph [0056]</p> <p>-----</p>	1,2,5,6, 11-14
A	<p>WO 03/020319 A1 (LIPOCORE HOLDING AB [SE]; FISCHER ANDREAS [SE]; ADDE CHRISTINA [SE]) 13 March 2003 (2003-03-13) page 4, line 23 - page 5, line 21 page 12, line 26 - line 28 page 14, line 32 page 21, line 20 - page 22, line 6 claims 1,17,20</p> <p>-----</p>	1,2,5,6, 11-14
A	<p>US 3 493 385 A (HACK ARTHUR W) 3 February 1970 (1970-02-03) column 1, line 39 - line 42 column 1, line 49 - line 56 column 2, line 3 - line 14</p> <p>-----</p>	1,2,5,6, 11-14
A	<p>JP H09 162 A (KAO CORP) 7 January 1997 (1997-01-07) paragraph [0006] - paragraph [0011]</p> <p>-----</p>	1,2,5,6, 11-14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2013/071708

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.:

2, 5, 6(completely); 1, 11-14(partially)

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: 2, 5, 6(completely); 1, 11-14(partially)

Bitter peptides encapsulated in an organogel, method for encapsulating bitter peptides in an organogel and nutritional application thereof

2. claims: 3, 9, 10(completely); 1, 11-14(partially)

Bitter peptides encapsulated in a liposome, method for encapsulating bitter peptides in a liposome and nutritional application thereof

3. claims: 4, 7, 8(completely); 1, 11-14(partially)

Bitter peptides encapsulated in a solid lipid nanoparticle, method for encapsulating bitter peptides in a solid lipid nanoparticle and nutritional application thereof

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2013/071708

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010039036 A1	08-04-2010	AU 2009300494 A1 EP 2346345 A1 US 2011189298 A1 WO 2010039036 A1	08-04-2010 27-07-2011 04-08-2011 08-04-2010
WO 2008130236 A2	30-10-2008	CN 101662947 A DK 2136649 T3 EP 2136649 A2 ES 2351780 T3 JP 5367695 B2 JP 2010524463 A US 2010129461 A1 US 2014099344 A1 WO 2008130220 A1 WO 2008130236 A2	03-03-2010 15-11-2010 30-12-2009 10-02-2011 11-12-2013 22-07-2010 27-05-2010 10-04-2014 30-10-2008 30-10-2008
EP 1897451 A1	12-03-2008	AU 2007293667 A1 BR PI0716985 A2 CN 101573051 A EP 1897451 A1 EP 2059139 A1 ES 2385058 T3 RU 2009113033 A US 2010009006 A1 WO 2008028951 A1	13-03-2008 25-02-2014 04-11-2009 12-03-2008 20-05-2009 17-07-2012 20-10-2010 14-01-2010 13-03-2008
JP H0283031 A	23-03-1990	NONE	
US 2009053290 A1	26-02-2009	CA 2645073 A1 EP 1998742 A2 US 2009053290 A1 WO 2007103555 A2	13-09-2007 10-12-2008 26-02-2009 13-09-2007
WO 03020319 A1	13-03-2003	NONE	
US 3493385 A	03-02-1970	DE 1289400 B US 3493385 A	13-02-1969 03-02-1970
JP H09162 A	07-01-1997	NONE	