

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Bunge Loders Croklaan USA, LLC

Application No./Patent No.: 7,645,473

Filed/Issue Date: January 12, 2010

Titled: FAT COMPOSITION

Bunge Loders Croklaan USA, LLC, a limited liability company

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)
- the patent application/patent identified above, by virtue of either:

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or a copy* is attached.

OR

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Anthony George Herzing, Gerald Patrick McNeill, Harold Kazier To: Loders Croklaan USA LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 18792, Frame 116, or a copy* is attached.

2. From: Loders Croklaan USA LLC To: Bunge Loders Croklaan USA, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 068209, Frame 0243, or a copy* is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or a copy* is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ *As required by 37 CFR 3.73(b)(1)(i), if a copy/copies is/are attached, the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Derick E. Allen/

Signature

August 21, 2024

Date

Derick E. Allen

Printed or Typed Name

43,468

Title or Registration Number

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**



UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
11/451,606

RECEIPT DATE / TIME
08/21/2024 04:59:09 PM Z ET

ATTORNEY DOCKET #
059490-5034

Title of Invention

FAT COMPOSITION

Application Information

APPLICATION TYPE Utility - Nonprovisional Application
under 35 USC 111(a)

PATENT # 7645473

CONFIRMATION # 9635

FILED BY Mary McKinney

PATENT CENTER # 66875989

FILING DATE 06/13/2006

CUSTOMER # 9629

FIRST NAMED
INVENTOR Anthony George Herzing

CORRESPONDENCE
ADDRESS -

AUTHORIZED BY Derick Allen

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
POA-65293994.pdf	1	Power of Attorney	488 KB
3.73b Statement- 65155542.pdf	1	Assignee showing of ownership per 37 CFR 3.73	170 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
POA-65293994.pdf	157D94934C93AE726A3DB8CF7215B285B1235167816D01F986 7DF6FB8AA11E1812149D88A94C163F235C6B4F5563842DD78 EBB24BC2718084D6D09806C6E9246
3.73b Statement-65155542.pdf	AAF2861E587FFD9170AAED6BBF19488F29FFD6C04CE7705B D8ADF9C6CBC6562535863AF586EBB71E1954135C88136A3D9

FCE8434161878A334FEE667DBCCA25E

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:



Practitioners associated with the Customer Number:

168239

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:



The address associated with Customer Number:

168239

OR

☐ Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone			Email

Assignee Name and Address:

Bunge Lodgers Croklaan USA, LLC
24708 W. Durkee Rd.
Channahon, IL 60410

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	 /	Date	8/20/2024
Name	Meghan McMaster	Telephone	
Title	Vice President		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,645,473 B2
APPLICATION NO. : 11/451606
DATED : January 12, 2010
INVENTOR(S) : Herzing et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

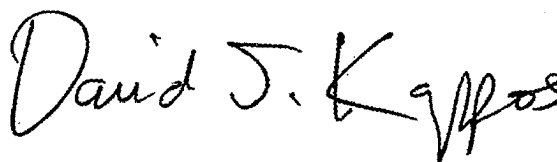
On the Title Page:

The first or sole Notice should read --

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b)
by 883 days.

Signed and Sealed this

Sixteenth Day of November, 2010

A handwritten signature in black ink, reading "David J. Kappos". The signature is written in a cursive, flowing style with a large initial 'D' and 'K'.

David J. Kappos
Director of the United States Patent and Trademark Office



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004

Mail Date: 04/21/2010

Applicant	: Anthony George Herzing	: DECISION ON REQUEST FOR
Patent Number	: 7645473	: RECALCULATION of PATENT
Issue Date	: 01/12/2010	: TERM ADJUSTMENT IN VIEW
Appliction No	: 11/451,606	: OF WYETH AND NOTICE OF INTENT TO
Filed	: 06/13/2006	: ISSUE CERTIFICATE OF CORRECTION
		:

The Request for Recalculation is **GRANTED** to the extent indicated.

The patent term adjustment has been determined to be **883** days. The USPTO will *sua sponte* issue a certificate of correction reflecting the amount of PTA days determined by the recalculation.

Prior to the issuance of the certificate of correction, the USPTO will afford patentee an opportunity to be heard and request reconsideration. Accordingly, patentee has **one month or thirty (30) days**, whichever is longer, to file a request for reconsideration of this patent term adjustment calculation. See 35 U.S.C. 154(b)(3)(B)(ii) and 37 CFR 1.322(a)(4). No extensions of time will be granted under 37 CFR 1.136.

Patentee should use document code PET.OP if electronically filing a request for reconsideration of this patent term adjustment calculation. The patentee must also include the information required by 37 CFR 1.705(b)(2) and the fee required by 37 CFR 1.18(e). If patentee does not file a timely request for reconsideration of this patent term adjustment calculation including the information required by 37 CFR 1.705(b)(2) and the fee required by 37 CFR 1.18(e), the USPTO will issue a certificate of correction reflecting the PTA determination noted above.

Patentee should be aware that in order to preserve the right to review in the United States District Court for the District of Columbia of the USPTO patent term adjustment determination, patentee must ensure that he or she also take the steps required under 35 U.S.C. 154(b)(4)(A) in a timely manner. Nothing in the request for recalculation should be construed as providing an alternative time frame for commencing a civil action under 35 U.S.C. 154(b)(4)(A).

Any questions concerning this decision should be directed to the Office of Patent Legal Administration at 571-272-7702.

REQUEST FOR RECALCULATION OF PATENT TERM ADJUSTMENT IN VIEW OF *WYETH**

Attorney Docket
Number: 059490-5034

Application
Number: 11/451,606

Filing Date
(or 371(b) or (f) Date): June 13, 2006

Patent Number: 7,645,473

Issue Date: January 12, 2010

First Named
Inventor: Anthony George Herzing

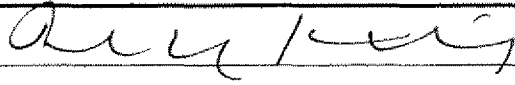
Title: Fat Composition

PATENTEE HEREBY REQUESTS RECALCULATION OF THE PATENT TERM ADJUSTMENT (PTA) UNDER 35 USC 154(b) INDICATED ON THE ABOVE-IDENTIFIED PATENT. THE PATENTEE'S SOLE BASIS FOR REQUESTING THE RECALCULATION IS THE USPTO'S PRE-WYETH INTERPRETATION OF 35 U.S.C. 154(b)(2)(A).

Note: This form is only for requesting a recalculation of PTA for patents issued before March 2, 2010, if the sole basis for requesting the recalculation is the USPTO's pre-Wyeth interpretation of 35 U.S.C. 154(b)(2)(A). See Instruction Sheet on page 2 for more information.

Patentees are reminded that to preserve the right to review in the United States District Court for the District of Columbia of the USPTO's patent term adjustment determination, a patentee must ensure that he or she also takes the steps required under 35 U.S.C. 154(b)(3) and (b)(4) and 37 CFR 1.705 in a timely manner.

**Wyeth v. Kappos*, No. 2009-1120 (Fed. Cir., Jan. 7, 2010).

Signature 	Date February 24, 2010
Name (Print/Typed) Paul N. Kokulis	Registration Number 16,773
Note: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.	
☒ *Total of <u>1</u> forms are submitted.	

The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	7077016
Application Number:	11451606
International Application Number:	
Confirmation Number:	9635
Title of Invention:	FAT COMPOSITION
First Named Inventor/Applicant Name:	Anthony George Herzing
Customer Number:	09629
Filer:	Paul N. Kokulis/Michele Hunt
Filer Authorized By:	Paul N. Kokulis
Attorney Docket Number:	059490-5034
Receipt Date:	24-FEB-2010
Filing Date:	13-JUN-2006
Time Stamp:	14:13:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for PTA recalculation in view of Wyeth	059490-5034ReqforRecalculati on.pdf	66395 856ce1435caab0d32c6ff0ba49da7e909b165ecd	no	1

Warnings:

Information:

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/451,606	01/12/2010	7645473	059490-5034	9635

9629 7590 12/23/2009
MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 746 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Anthony George Herzing, Channahon, IL;
Gerald Patrick McNeill, Channahon, IL;
Harold Kazier, Channahon, IL;

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

9629 7590 08/28/2009
MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/451,606	06/13/2006	Anthony George Herzing	059490-5034	9635

TITLE OF INVENTION: FAT COMPOSITION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	11/30/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
PADEN, CAROLYN A	1794	426-601000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

Morgan Lewis & Bockius
LLP

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Loders Croklaan USA LLC

Channahon, Illinois 60410-5249

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
- ☒ Publication Fee (No small entity discount permitted)
- ☒ Advance Order - # of Copies 4

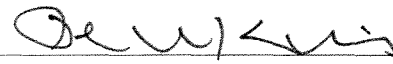
4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 50-0310 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature 

Date November 25, 2009

Typed or printed name Paul N. Kokulis

Registration No. 16,773

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal

Application Number:	11451606			
Filing Date:	13-Jun-2006			
Title of Invention:	FAT COMPOSITION			
First Named Inventor/Applicant Name:	Anthony George Herzing			
Filer:	Paul N. Kokulis/Michele Hunt			
Attorney Docket Number:	059490-5034			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1510	1510
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Printed copy of patent - no color	8001	4	3	12
Total in USD (\$)				1822

Electronic Acknowledgement Receipt

EFS ID:	6524373
Application Number:	11451606
International Application Number:	
Confirmation Number:	9635
Title of Invention:	FAT COMPOSITION
First Named Inventor/Applicant Name:	Anthony George Herzing
Customer Number:	09629
Filer:	Paul N. Kokulis/Michele Hunt
Filer Authorized By:	Paul N. Kokulis
Attorney Docket Number:	059490-5034
Receipt Date:	25-NOV-2009
Filing Date:	13-JUN-2006
Time Stamp:	11:09:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1822
RAM confirmation Number	9383
Deposit Account	500310
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	059490-5034IssueFee.pdf	178874	no	1
			a98e31fcc69eb0a54e9b94e8db5f6f4eb18e94ae		

Warnings:

Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	33486	no	2
			9ec37ec5b1980aecf44b92fb9ffe3d1a7138c5f		

Warnings:

Information:

Total Files Size (in bytes):			212360
------------------------------	--	--	--------

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

INFORMATION DISCLOSURE CITATION (Use several sheets if necessary) PTO Form 1449	Attorney Docket No. 059490-5034	Serial No. <u>11/451,606</u> ~~Unassigned~~
	Applicants Tony HERZING, et al.	
	Filing Date June 13, 2006	Group Unassigned

U.S. PATENT DOCUMENTS

*Examiner Initial	Document Number	Date	Name	Class	Sub Class	Filing Date
/CP/ ↓	5,939,114	Aug. 17, 1999	Cain, et al.			
	5,288,513	Feb. 22, 1994	Cain, et al.			
	~~5,271,590~~	Dec. 21, 1993	Yamaguchi, et al.	~~5,271,590~~		
	2005/0142275 A1	June 30, 2005	Bach, et al.			

FOREIGN PATENT DOCUMENTS							
	Document Number	Date	Country	Class	Sub Class	Translation YES NO	
/CP/ ↓	EP 0 815 738 A1	Jan. 7, 1998	Europe				
	WO 95/07619	March 23, 1995	WIPO				
	EP 0 731 645	Sept. 18, 1996	Europe				
	EP 0 728 415 A1	Aug. 28, 1996	Europe				
	EP 0 783 250 A	July 16, 1997	Europe				
	WO 96/31240	Oct. 10, 1996	WIPO				

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		

Examiner /Carolyn Paden/ (08/12/2009)	Date Considered 08/12/2009
Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

9629 7590 08/28/2009

MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004

EXAMINER

PADEN, CAROLYN A

ART UNIT

PAPER NUMBER

1794

DATE MAILED: 08/28/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/451,606	06/13/2006	Anthony George Herzing	059490-5034	9635
TITLE OF INVENTION: FAT COMPOSITION				

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	11/30/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

9629 7590 08/28/2009

MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/451,606	06/13/2006	Anthony George Herzing	059490-5034	9635

TITLE OF INVENTION: FAT COMPOSITION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	11/30/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
PADEN, CAROLYN A	1794	426-601000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/451,606	06/13/2006	Anthony George Herzing	059490-5034	9635
9629	7590	08/28/2009	EXAMINER	
MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004			PADEN, CAROLYN A	
			ART UNIT	PAPER NUMBER
			1794	
DATE MAILED: 08/28/2009				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 746 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 746 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	11/451,606	HERZING ET AL.	
	Examiner	Art Unit	
	Carolyn A. Paden	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to 12-26-07.
2. ☒ The allowed claim(s) is/are 1-26.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. ☐ Notice of References Cited (PTO-892) | 5. ☐ Notice of Informal Patent Application |
| 2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date <u>12-26-07;1-11-07;6-13-06</u> | 7. ☒ Examiner's Amendment/Comment |
| 4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. ☒ Examiner's Statement of Reasons for Allowance |
| | 9. ☐ Other _____. |

/Carolyn A Paden/
Primary Examiner, Art Unit 1794

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows:

The Specification has been amended to comply with standard US practice as follows:

At page 1, after the title, -Background of the Invention- has been inserted.

At page 3, after line 2 -Summary of the Invention- has been inserted.

At page 4, after line 20, -Detailed Description of the Invention- has been inserted.

REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance:
None of the references show all of the features of claim 1.

The reference to Lanza EP 1040761 and US 6277433 teaches a shea oil olein composition at column 2, lines 20-39 that does not have the

specific weight ratio of C18 to C24/C16 that is required in lines 19-21 of claim 1. The examples show a blended triglyceride in example 3 that contains the required weight ratio of C18 to C24/C16 but would not be expected to contain the triglycerides required in claim 1, lines 6-10.

The reference to Cain 5858427 shows the triglyceride composition of the claims but does not disclose the SUS and SSU content of the fat. Also the SUS content falls outside of the range of the claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carolyn A Paden whose telephone number is (571) 272-1403. The examiner can normally be reached on Monday to Friday from 7 am to 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached by dialing 571-272-

1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Carolyn Paden/

Primary Examiner 1794

Issue Classification 	Application/Control No. 11451606	Applicant(s)/Patent Under Reexamination HERZING ET AL.
	Examiner Carolyn A Paden	Art Unit 1794

ORIGINAL						INTERNATIONAL CLASSIFICATION													
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED								
426		607				A	2	3	D	9 / 00 (2006.01.01)									
CROSS REFERENCE(S)																			
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																		
426	601																		

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	10		15												
	19		16												
	1		17												
	2		18												
	3		19												
	4		20												
	5		21												
	6		22												
	7		23												
	8		24												
	9		25												
	10		26												
	11														
	12														
	13														
	14														

NONE		Total Claims Allowed: 26	
(Assistant Examiner)	(Date)		
/Carolyn A Paden/ Primary Examiner.Art Unit 1794	08/13/2009	O.G. Print Claim(s) 1	O.G. Print Figure none
(Primary Examiner)	(Date)		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	
Tony HERZING, et al.	)	
	)	
Application No.: Unassigned	)	Group Art Unit: Unassigned
	)	
Filed: June 13, 2006	)	Examiner: Unassigned
	)	
For: FAT COMPOSITION	)	

Commissioner for Patents
MAIL STOP PATENT APPLICATION

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97(b)

Pursuant to 37 C.F.R. §§ 1.56 and 1.97(b), Applicant brings to the attention of the Examiner the documents listed on the attached PTO-1449.

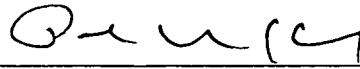
A copy of each listed document is attached. U.S. references will be provided by request. Applicants respectfully request that the Examiner consider the listed documents and evidence that consideration by making appropriate notation on the attached form.

This submission does not represent that a search has been made or that no better art exists and does not constitute an admission that the listed documents are material or constitute "prior art." If it should be determined that the listed documents do not constitute "prior art" under United States law, Applicants reserve the right to present to the Office the relevant facts and law regarding the appropriate status of such documents. Applicants further reserve the right to take appropriate action to establish the patentability of the disclosed invention over the listed documents, should the documents be applied against the claims of the present application.

If there is any fee due in connection with the filing of this Statement, please charge the fee to our Deposit Account No. 50-0310.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP



Paul N. Kokulis, Reg. No. 16,773

Date: June 13, 2006

MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
(202) 739-3000

INFORMATION DISCLOSURE CITATION (Use several sheets if necessary) PTO Form 1449	Attorney Docket No. 059490-5034	Serial No. Unassigned
	Applicants Tony HERZING, et al.	
	Filing Date June 13, 2006	Group Unassigned

U.S. PATENT DOCUMENTS

*Examiner Initial	Document Number	Date	Name	Class	Sub Class	Filing Date
/CP/	5,939,114	Aug. 17, 1999	Cain, et al.			
↓	5,288,513	Feb. 22, 1994	Cain, et al.			
	5,271,590	Dec. 21, 1993	Yamaguchi, et al.			
	2005/0142275 A1	June 30, 2005	Bach, et al.			

FOREIGN PATENT DOCUMENTS								
	Document Number	Date	Country	Class	Sub Class	Translation		
						YES	NO	
/CP/	EP 0 815 738 A1	Jan. 7, 1998	Europe					
↓	WO 95/07619	March 23, 1995	WIPO					
	EP 0 731 645	Sept. 18, 1996	Europe					
	EP 0 728 415 A1	Aug. 28, 1996	Europe					
	EP 0 783 250 A	July 16, 1997	Europe					
	WO 96/31240	Oct. 10, 1996	WIPO					

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		

Examiner /Carolyn Paden/ (08/12/2009)	Date Considered 08/12/2009
Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	5	"6277433"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 10:20
L2	1220	(426/606,607).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/08/13 10:23
L3	126	l2 and shea and palm	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 10:25
L4	60	("s3" or sss or hhh or h3) and U3 and (sos or sus or huh or h2u or s2u) and (hu2 or su2)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 10:27
L5	4	l2 and shea and palm and L4	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 10:27
L6	1220	(.426/606,607).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/08/13 10:30
L7	34	(L6 or sss or hhh or h3) and U3 and (sos or sus or huh or h2u or s2u) and (hu2 or su2)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 10:30

S1	3	10/986044	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/12 16:07
S2	3	10/972615	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/12 16:09
S3	1220	(.426/606,607).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/08/12 16:14
S4	1756	(.426/601).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/08/12 16:14
S5	60	("s3" or sss or hhh or h3) and U3 and (sos or sus or huh or h2u or s2u) and (hu2 or su2)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/12 16:17
S6	7	S3 and S5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/12 16:18
S7	209	S3 and S4	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/12 16:18
S8	5	S4 and S5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/12 16:18

S9	10	((("5939114") or ("5288513") or ("5271590") or ("20050142275") or ("5858427") or ("5849940") or ("6277433") or ("5271950") or ("5718938") or ("2005281935") or ("5935627") or ("5858427") or ("5849940") or ("6277433") or ("5271950") or ("5718938"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/08/13 09:16
S11	123685	("426").CLAS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/08/13 09:33
S12	122	Yamaguchi.in. and (fat or oil) and S11	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 09:33
S13	2541	Yamaguchi.in. and (fat or oil)	US-PGPUB; USPAT; USOCR	OR	ON	2009/08/13 09:35
S14	150099	((("426") or ("554"))).CLAS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/08/13 09:35
S15	87	S13 and S14	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 09:36
S16	0	Yamaguchi.in. and (fat or oil) and "12211993".pd.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 09:39

S17	7	Yamaguchi.in. and (fat or oil) and "19931221". pd.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 09:40
-----	---	--	---	----	----	---------------------

8/ 13/ 09 10:41:39 AM

C:\ Documents and Settings\ CPaden\ My Documents\ EAST\ Workspaces\ 11\ 451606.wsp



PATENT
ATTORNEY DOCKET NO. 059490-5034-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
	)	
Inventor(s): Anthony George HERZING et al.	)	
	)	
Application No.: 11/451,606	)	Group Art Unit: 1761
	)	
Filed: June 13, 2006	)	Examiner: unassigned
	)	
For: FAT COMPOSITION	)	

SUPPLEMENTAL DISCLOSURE STATEMENT

Commissioner for Patents
U.S. Patent and Trademark Office
Customer Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

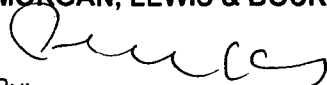
Supplementing the applicants' Information Disclosure Statement filed on June 13, 2006, attached hereto is a supplemental PTO-1449 listing additional documents known to the applicants. Copies of the EP publications and Kallio et al. disclosure are attached.

The Examiner's attention is also called to the commonly assigned, copending U.S. Application No. 10/986,044 and Application No. 10/972,615.

The Examiner is requested to consider the foregoing and the attached , along with the earlier filed disclosure submission, in the examination of this application.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP


By: _____
Paul N. Kokulis
Reg. No. 16,773

Dated: January 11, 2007

Customer No. 09629
MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
(202) 739-3000

1-WA/2221197.1



INFORMATION DISCLOSURE CITATION (Use several sheets if necessary) PTO Form 1449	Attorney Docket No. 059490-5034	Serial No. 11/451,606
	Applicants Anthony George HERZING et al.	
	Filing Date June 13, 2006	Group 1761

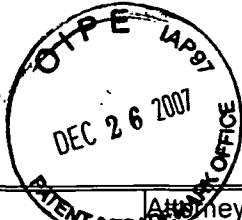
U.S. PATENT DOCUMENTS

*Examiner Initial	Document Number	Date	Name	Class	Sub Class	Filing Date
/CP/	5,935,627	08/1999	Cain et al.	426	93	

FOREIGN PATENT DOCUMENTS								
	Document Number	Date	Country	Class	Sub Class	Translation		
						YES	NO	
/CP/	0 536 824 A1	04/1993	Europe	A23D	9/00	X		
/CP/	0 555 917 A1	08/1993	Europe	A23D	9/00	X		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
/CP/		Kallio et al., J. Agric. Food Chem., 49:3363-3369 (2001)

Examiner	/Carolyn Paden/ (08/12/2009)	Date Considered	08/12/2009
Examiner:	Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.		



INFORMATION DISCLOSURE CITATION (Use several sheets if necessary) PTO Form 1449	Attorney Docket No. 059490-5034	Serial No. 11/451,606
	Applicants Anthony George HERZING et al.	
	Filing Date June 13, 2006	Group 1761

U.S. PATENT DOCUMENTS

*Examiner Initial	Document Number	Date	Name	Class	Sub Class	Filing Date
↓ ↓	5,858,427	01/1999	Cain et al.	426	101	
	5,849,940	12/1998	Harris et al.	554	206	
	2005/281935 A1	12/2005	Floter et al.	426	601	
	6,277,433	08/2001	Lantz et al.	426	606	
	5,271,950	12/1993	Yamaguchi et al.	426	607	
	5,718,938	02/1998	Cain et al.	426	549	

FOREIGN PATENT DOCUMENTS								
		Document Number	Date	Country	Class	Sub Class	<u>Translation</u>	
							YES	NO
/CP/		EP 1 040 761 A1	10/2000	Europe	A23D	9/00	X	
/CP/		2,154,570	08/1994	Canada	A23D	7/00	X	

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
/CP/		Hui, Y.H., "Edible oil and fat products: products and application technology", Bailey's Industrial Oil & Fat Products, 3:382 (1996) XP002112226

Examiner /Carolyn Paden/ (08/12/2009)	Date Considered 08/12/2009
Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1220	(.426/606,607).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/08/13 15:03
L2	1758	(.426/601).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/08/13 15:03
L3	2769	L1 or L2	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 15:03
L4	1220	(.426/606,607).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/08/13 15:04
L5	0	(L4 or sss or hhh or h3).clm. and U3.clm. and (sos or sus or huh or h2u or s2u).clm. and (hu2 or su2).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/08/13 15:04

8/ 13/ 09 3:04:50 PM**C:\ Documents and Settings\ CPaden\ My Documents\ EAST\ Workspaces\ 11\ 451606.wsp**



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 9635

SERIAL NUMBER 11/451,606	FILING or 371(c) DATE 06/13/2006 RULE	CLASS 426	GROUP ART UNIT 1794	ATTORNEY DOCKET NO. 059490-5034		
APPLICANTS Anthony George Herzing, Channahon, IL; Gerald Patrick McNeill, Channahon, IL; Harold Kazier, Channahon, IL; ** CONTINUING DATA ***** ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 12/13/2006						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/CAROLYN A PADEN/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY IL	SHEETS DRAWINGS 0	TOTAL CLAIMS 26	INDEPENDENT CLAIMS 1
ADDRESS MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004 UNITED STATES						
TITLE Fat composition						
FILING FEE RECEIVED 1430	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit			

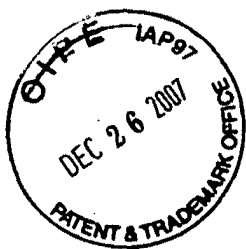
Search Notes 	Application/Control No. 11451606	Applicant(s)/Patent Under Reexamination HERZING ET AL.
	Examiner Carolyn A Paden	Art Unit 1794

SEARCHED			
Class	Subclass	Date	Examiner
426	601,606,607	8-13-09	cap

SEARCH NOTES		
Search Notes	Date	Examiner
see attached search	8-13-09	cap

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
see attached search		8-13-09	cap

--	--



PATENT
ATTORNEY DOCKET NO. 059490-5034-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
	)	
Inventor(s): Anthony George HERZING et al.	)	
	)	
Application No.: 11/451,606	)	Group Art Unit: 1761
	)	
Filed: June 13, 2006	)	Examiner: unassigned
	)	
For: FAT COMPOSITION	)	

SUPPLEMENTAL DISCLOSURE STATEMENT

Commissioner for Patents
U.S. Patent and Trademark Office
Customer Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

Supplementing the applicants' Information Disclosure Statement filed on June 13, 2006, attached hereto is a copy of the International Search Report (ISR) that has been issued for the applicants' corresponding international (PCT) application.

A PTO-1449 listing the references cited in the ISR is attached along with copies of the listed references except in the case of U.S. patent and patent publications which it is understood need not be submitted.

The Examiner is requested to consider this submission in the examination of this application. The return of an initialed copy of the PTO-1449 and the one earlier filed indicating the Examiner's consideration of the listed references is requested.

The applicants do not believe that a fee is required but, if one should be, please charge to Deposit Account No. 50-0310.

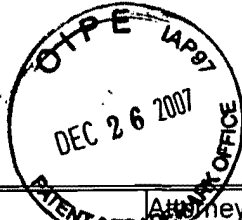
Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

By: 
Paul N. Kokulis
Reg. No. 16,773

Dated: December 26, 2007

Customer No. 09629
MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
(202) 739-3000

**INFORMATION DISCLOSURE CITATION**

(Use several sheets if necessary)

PTO Form 1449

Attorney Docket No.

059490-5034

Serial No.

11/451,606

Applicants

Anthony George HERZING et al.

Filing Date

June 13, 2006

Group 1761

U.S. PATENT DOCUMENTS

*Examiner Initial	Document Number	Date	Name	Class	Sub Class	Filing Date
	5,858,427	01/1999	Cain et al.	426	101	
	5,849,940	12/1998	Harris et al.	554	206	
	2005/281935 A1	12/2005	Floter et al.	426	601	
	6,277,433	08/2001	Lantz et al.	426	606	
	5,271,950	12/1993	Yamaguchi et al.	426	607	
	5,718,938	02/1998	Cain et al.	426	549	

FOREIGN PATENT DOCUMENTS

	Document Number	Date	Country	Class	Sub Class	Translation	
						YES	NO
	EP 1 040 761 A1	10/2000	Europe	A23D	9/00	X	
	2,154,570	08/1994	Canada	A23D	7/00	X	

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

	Hui, Y.H., "Edible oil and fat products: products and application technology", Bailey's Industrial Oil & Fat Products, 3:382 (1996) XP002112226

Examiner

Date Considered

Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : A23D 7/00, A21D 13/08		A1	(11) International Publication Number: WO 94/16572
			(43) International Publication Date: 4 August 1994 (04.08.94)
(21) International Application Number: PCT/EP94/00066		(81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, LV, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 11 January 1994 (11.01.94)		2154570 Published With international search report.	
(30) Priority Data: 93200219.9 28 January 1993 (28.01.93) NL			
(71) Applicant (for AU BB CA GB IE LK MN MW NZ SD only): UNILEVER PLC (GB/GB); Unilever House, Blackfriars, London EC4 4BQ (GB).			
(71) Applicant (for all designated States except AU BB CA GB IE LK MN MW NZ SD): UNILEVER N.V. [NL/NL]; Weena 455, NL-3013 AL Rotterdam (NL).			
(72) Inventor: LANSBERGEN, Gabriel, Jacobus, T.; Lepstraat 8, NL-2691 EX 's-Gravenzande (NL).			
(74) Common Representative: UNILEVER N.V.; Patent Division, P.O. Box 137, NL-3130 AC Vlaardingén (NL).			
(54) Title: NATURAL PUFF-PASTRY MARGARINES			
(57) Abstract			
The invention concerns puff pastry margarines, comprising a fat-continuous emulsion having a fat content of at least 60 wt %, wherein the fat comprises the following triglycerides: $H_3 = 3-30$ wt %, $H_2U = 25-60$ wt %, $HU_2 + U_3 < 65$ wt %, H = saturated fatty acid $C_{18}-C_{22}$, U = unsaturated fatty acid $C_{18}-C_{22}$ which emulsions display at temperatures between $5-30^\circ\text{C}$ a hardness of 1200-2000 and a solid fat index, such that at a preselected temperature between 5 and 30°C $C/N^2 \geq 1.5$.			

NATURAL PUFF-PASTRY MARGARINES

Puff-pastry margarines have to meet specific requirements in terms of hardness at the working temperature (= temperature at which they are applied) and solid fat content (N-values, measured according to an NMR pulse method after specific pre-treatment of the fat). As the margarines are applied in combination with a dough and a lamination process has to be carried out on the combined dough/margarine product, the C-values at the working temperature may not be too high since this would result in damaging the dough layer; on the other hand, the fat may not be too soft because this would result in undesired spreading of the fat, removing most of it from the system.

Therefore, the C-values of puff-pastry margarines at the working temperature should be 1200-2000. Depending on the climate of the country where the product is made, the working temperatures are normally within the range of 5-30°C.

C-values are measured according to the technique disclosed in J. Amer. Oil Chem. Soc. 36 (1959), 345-348, using a cone penetrometer.

In order to achieve a right consistency, the fats applied should have a particular solid fat content measured according to the NMR pulse method disclosed in Fette, Seifen, Anstrichmittel 80 (1978), 180-186. This solid fat content (indicated by N) is measured after a particular pre-treatment of the fat. This pre-treatment consists of the following steps : melting at 60°C; 1 hr at 0°C and 30 min at measurement temperature (= UMA-1).

In our Australian Patent N° 587,435 margarines and shortenings have been disclosed that are suitable for puff

pastry purposes and wherein the fat component always contains a lauric fat or a hardened component. As hardening inevitably leads to the presence of trans-acids in the fats, the compositions will contain some trans-acids and are therefore not completely natural. Since there is a trend towards more natural products, we have performed a study in order to find out whether puff pastry margarines could be made that do not contain hardened fats (so, no trans-acids) but that still meet the required conditions for C-value and N-value. In fact, it can be concluded, e.g., from Table I from the above-mentioned Australian patent, that the prior art products according to this patent have C-values (after 15 minutes at 15°C) of 1000-8000 g/cm², while its N₁₅ values range from 27.5-35.0 wt.%.
15

The presence of lauric fats has the disadvantage of entailing shorter shelf-lives because of hydrolysis occurring upon storage.

20 The studies referred to above have resulted in our invention, which therefore concerns puff-pastry margarines comprising a fat-continuous emulsion having a fat content of at least 60 wt.%, preferably of at least 80 wt.%, wherein the fat comprises the following triglycerides :

25 H₃ = 3-30 wt.% calculated on the fat, preferably 5-25 wt.%;

 H₂U = 25-60 wt.% calculated on the fat, preferably 35-55 wt.%;

30 HU₂ + U₃ = < 65 wt.% calculated on the fat, preferably 10-65, in particular 30-50 wt.%, in which

H = saturated fatty acid C₁₆-C₂₂;

U = mono- or polyunsaturated fatty acid C₁₈-C₂₂;

which emulsion, at working temperatures between 5 and 30°C, displays a hardness C of 1200 to 2000, while at the same time the solid fat index N (UMA-1) of the fat is such that at least at a pre-selected working temperature
35

$\frac{C}{N^2} \geq 1.5$, preferably $\frac{C}{N^2} = 1.5-2.5$.

- 5 The above-mentioned fats are free of trans-acids, meaning that the content of H₂E-triglycerides is less than 4 wt.%, preferably less than 1.0 wt.% (H as above, E = elaidic acid). Moreover, the fats are free of lauric fats.
- 10 Although margarines (= print margarines) are known that have a $\frac{C}{N^2} = 1.8$ (see our Dutch patent application N° 8205047), these margarines are fully based on hardened fats with relatively low C-values (250-400 g/cm²).
- 15 On the basis of the data laid down in Table I of our Australian patent N° 587,435, $\frac{C}{N^2}$ -values can be calculated that are in the range of 1.3-6.7. However, it should be
- 20 noted that :
1. the above-mentioned figures do account for fats containing trans-acids or laurics;
 2. C-values above 2,000 are unacceptable for puff pastries;
 - 25 3. the data for hardness C were obtained in products that were not yet completely homogeneous so that the C-values are not quite comparable with our C-values.

Fats very suitable for our puff-pastry margarines are

30 preferably chosen from the group consisting of palm oil, or palm oil fractions, in particular palm oil stearin, palm oil mid-fractions or mixtures thereof. In order to obtain the desired consistency, it is preferred that some liquid oil, in particular soybean oil, be present in our fat

35 composition. Very suitable fat compositions comprise :

20-35 wt.% of a palm oil stearin;

15-25 wt.% of a palm oil mid-fraction;

10-35 wt.% of a palm oil;

0-40 wt.% of a liquid oil (preferably soybean oil).

The N-lines (UMA-1) of the different palm fat components
5 are preferably :

Palm oil stearin : $N_{10} = 60-85$
 $N_{20} = 45-70$
 $N_{30} = 25-50$
 10 $N_{35} = 15-40$

Palm oil mid-fraction : $N_{10} = 60-95$
 $N_{20} = 25-85$
 $N_{30} = 0.2-15$
 15 $N_{35} = 0-4$

Palm oil : $N_{20} = 10-30$
 $N_{30} = 2-12$
 $N_{35} = < 7$
 20

It is, however, preferred to apply a fat or a fat mixture that displays an N-value at working temperature below 38. As the C-value ranges from 1200 to 2000, it will be obvious that a fat having e.g. an $N_{20} = 43$ can only be applied at a
 25 higher working temperature (i.e. above 20°C in this case), where its N-values are lower, in order to meet the requirement of $\frac{C}{N^2} > 1.5$.

30 The above-mentioned fat emulsions can be applied with good results in puff pastries; therefore, puff pastries wherein the fat component consists at least partly of the margarine according to the invention are also part of the invention. Application of the above-mentioned margarines can lead to
 35 puff pastries with a gravity index of 1.0-1.4 (gravity index is defined as height of patty (mm) : weight of patty (g)).

The margarines can be made according to known margarine processing techniques. This means that, e.g., one of the following Votator sequences could be applied : AAB or AACB
5 or AACAB. In case sequence AAB is applied sieve-plates must be present, in order to make a homogeneous product. Dosing rates of 50-100 kg/h were applied at pilot plant scale, while the coolant temperatures applied in the A-units were 0 to -25°C.

10

2154570

6

EXAMPLES

Four fat blends were made with the composition according to Table I

5

TABLE I

	<u>Blend</u>	<u>PO-s</u> (wt.%)	<u>PO-m</u> (wt.%)	<u>PO</u> (wt.%)	<u>BO</u> (wt.%)	N ₁₀	N ₂₀	N ₃₀	N ₃₅
10	1	25	20	45	10	62	42	20	14
	2	25	20	35	20	55	36	17	13
	3	30	20	15	35	48	31	16	12
	4	30	20	25	25	54	37	15	11

15

The N-lines of the different components were as follows :

	Palm oil stearin :	N ₁₀ = 78
		N ₂₀ = 66
20		N ₃₀ = 47
		N ₃₅ = 38

	Palm oil mid-fraction :	N ₁₀ = 92
		N ₂₀ = 79
25		N ₃₀ = 11
		N ₃₅ = 3

	Palm oil :	N ₂₀ = 25
		N ₃₀ = 9
30		N ₃₅ = 5

The triglyceride composition of these components is given in Table II.

35

2154570

TABLE II

	H ₃	H ₂ U	HU ₂
5 Palm oil stearin	33	44	14
Palm oil mid-fraction	3	89	6
Palm oil	8	45	28

The N-values of the 4 blends are mentioned in Table I.

10

For the preparation of an 80% fat emulsion the Votator sequence AAB was applied.

C-values were measured at 15, 20 and 25 °C.

15 This resulted in the following data (Table III).

Blend	C ₁₅	C ₂₀	C ₂₅	N ₁₅	N ₂₀	N ₂₅	C/N ² at:		
							15°C	20°C	25°C
1	4200	2750	1400	52	42	31	1.6	1.6	1.5
2	3200	1900	1100	45	36	27	1.6	1.5	1.5
20 3	2650	1550	850	40	31	24	1.7	1.6	1.5
4	4100	2350	1200	47	37	28	1.9	1.7	1.5

The above-mentioned four blends were used in the preparation of puff pastries. The following process was followed therefor.

25

Recipe:

Premix:

Patent flour: 1000 g
 30 Puff pastry margarine: 200 g
 Water: 520 g

The puff-pastry margarine was tempered before use during 12

2154570

8

hrs at working temperature.

The dough was prepared in a Diosna Kneading Machine. 1600 g of the dough were leavened, and rested during 10 min. The dough was applied at working temperature. The dough was cut in the usual way and 800 g of the puff-pastry margarine was added. The system was subjected to 6 half turns in three. After every 2 turns the dough was rested for 45 min. Positions of the laminating machine were: 25-20-15-12-10. The dough was laminated using these positions: after 1/4 turn lamination proceeded at 12-8-6; after another 1/4 turn the lamination proceeded at 5-4-3 3/4. The patties were cut. After 1 hr rest the patties were baked at 240°C for 20 min.

15

This resulted in patties with the following properties (see Table IV) :

TABLE IV

20

Trial no. IT26P..	Application temperature	PATTY		
		height	weight	GI
1	25°C	36.6	28.2	1.3
	20°C	39.1	32.7	1.19
2	20°C	42.3	33.9	1.25
3	20°C	40.4	34.1	1.18
4	20°C	33.4	31.7	1.05
	25°C			1.18

25

CLAIMS:

1. Puff-pastry margarine comprising a fat-continuous emulsion having a fat content of at least 60 wt.%, wherein the fat comprises the following triglycerides:
 - H₃ = 3 -30 wt.% calculated on the fat;
 - H₂U = 25-60 wt.% calculated on the fat;
 - HU₂ + U₃ = < 65 wt.% calculated on the fat;
 - H₂E, less than 4 wt%, while the fat is free of lauric-fats, in which
 - H = saturated fatty acid C₁₆-C₂₂;
 - U = mono- or polyunsaturated fatty acid C₁₈-C₂₂;
 - E = elaidic acid
 which emulsion, at working temperatures between 5 and 30°C, displays a hardness C of 1200 to 2000, while at the same time the solid fat index N (UMA-1) of the fat is such that at least at a preselected working temperature $\frac{C}{N^2} \geq 1.5$.
2. Puff-pastry margarine according to claim 1 wherein H₃ is 5-25 wt.% calculated on the fat.
3. Puff-pastry margarine according to claim 1 wherein H₂U is 35-55 wt.% calculated on the fat.
4. Puff-pastry margarine according to claim 1 wherein HU₂ + U₃ = 30-50 wt.% calculated on the fat.
5. Puff-pastry margarine according to any one of claims 1-4, wherein C and N of the emulsion are such that $\frac{C}{N^2}$ at the working temperature is 1.5-2.5.
6. Puff-pastry margarine according to any one of claims 1-5 wherein the fat contains less than 1 wt.% of H₂E fats.

7. Puff-pastry margarine according to any one of claims 1-6 wherein the fat content is at least 80 wt.%.
8. Puff-pastry margarine according to any one of claims 1-7,
5 wherein the fat is chosen from the group consisting of palm oil or palm oil fractions or mixtures thereof.
9. Puff-pastry margarine according to claim 8 wherein said palm oil fractions comprise palm oil stearin, palm oil mid-
10 fraction or mixtures thereof.
10. Puff-pastry margarine according to any one of claims 1-9, wherein the fat phase consists of 20-35 wt.% of palm oil stearin, 15-25 wt.% of palm oil mid-fraction, 10-55 wt.% of
15 palm oil and 0-40 wt.% of a liquid oil.
11. Puff-pastry margarine according to any one of claims 1-10, wherein the solid fat content (UMA-1) of the fat at working temperature is less than 38.
20
12. Puff pastries containing as fat component the puff-pastry margarines any one of claims 1-11.
13. Puff pastries according to claim 12, wherein the gravity
25 index of the puff pastries is 1.0-1.4.

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 1 040 761 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
04.10.2000 Bulletin 2000/40

(51) Int. Cl.7: **A23D 9/00**, C11C 3/10,
A23G 3/00

(21) Application number: **00200721.9**

(22) Date of filing: **29.02.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **19.03.1999 EP 99200868**

(71) Applicant: **LODERS CROKLAAN B.V.**
1521 AZ Wormerveer (NL)

(72) Inventors:

- **Lantz, Ingo**
22149 Hamburg (DE)
- **Schroeder, Annette**
27749 Delmenhorst (DE)

(74) Representative:

Wurfbain, Gilles L. et al
Unilever N.V.,
Patent Division,
P.O. Box 137
3130 AC Vlaardingen (NL)

(54) **Fat mixtures**

(57) Randomized fats from triglycerides with a fatty
acid composition of:

- 20-50% C18:0
- 30-60% C18:1
- 5-15% C16:0 and
- 0-15% C18:2

perform very well, when applied in food products.

EP 1 040 761 A1

Description

[0001] Natural fats are often fractionated in order to get fractions that have improved properties compared with the unfractionated fats. Examples hereof are fractions of palm oil, shea oil, coconut oil, palm kernel oil and many others. From EP 815 738 blends are known that comprise "an interesterified Shea-olein fraction". However the interesterification conditions are not given and therefore it remains unclear whether this interesterification resulted in randomisation or not. Moreover it remains unclear whether a fraction of an interesterified Sh-olein is applied or whether a fraction of Sh-olein is subjected to interesterification and the product resulting therefrom is used. The blend comprising the product is used for making a whipping cream, respectively a whipped filling fat, although in the text also the use in wrapper margarine is indicated. It is said that by using this fat post-hardening problems of the fat can be reduced. The blends are based on fats with saturated C16 and/or C18 fatty acids in it, such as palm oil or fractions thereof. A disadvantage of the upgrading of a fat by fractionation often is that in addition to the desired fraction with the required product performance also one or more fractions are obtained that are not useful for application in foods. Often these fractions are too liquid, meaning that they have too low solid fat contents if measured by an NMR pulse technique to be able to apply them successfully in foods. These fractions then have to be discarded or have to be used for less useful applications like caddie feed. It would therefore be very beneficial if for such fractions a suitable application could be found, either for the fat as such or after being converted into another fat composition. We therefore studied whether we could find ways to upgrade such (waste) oils. There are actually two different routes of improvement possible:

Route 1 consists of a hardening process which will result in a high trans fatty acid content of the improved product. Route 2 which is part of the invention consists of a randomization process which results in a product having no increase in trans fatty acids. This study resulted in the finding of novel fat compositions with beneficial properties that can be applied in many food compositions. Those novel fats were found to have higher solid fat contents than the fats they were made from. Therefore these novel fats can be used to structure eg liquid oils often used in food compositions like margarines (puff pastry or cream) or icings, while they are also very useful as frying oil either as pure fat or as a blend with one or more other fats or oils.

[0002] An example of an attempt to reuse a liquid oil is disclosed in EP 69599. According to this patent a CBE is made from shea oil by fractionation. The olein fraction formed as side product is up-graded by subjecting it to a directed 1,3 enzymic interesterification. By this process the fatty acid groups bonded to the 1,3 positions of the triglycerides are redistributed and some more of the SOS compound is formed. This is isolated by fractionation. Still an olein fraction is obtained as side product for which no use exists.

[0003] Thus our invention concerns in the first instance a fat composition having a triglyceride composition, corresponding with a randomized, interesterified fat having a fatty acid composition of:

20-50 wt% C18:0
30-60 wt% C18:1
5-15 wt% C16:0 and
0-15 wt% C18:2

[0004] Our process leads to a different triglyceride composition than obtained by the process according to EP 69599, because in that process only the fatty acids in the 1 and 3 positions are interexchanged, whereas in our process all fatty acid groups present in the fat participate in the interesterification.

[0005] Preferred fat compositions are fat compositions, wherein the composition comprises

4 to 10 wt% of SSS
5 to 15 wt% of SUS
10 to 20 wt% of SSU
15 to 30 wt% of SUU
8 to 20 wt% of USU
12 to 30 wt% of UUU-triglycerides

preferably 4-8 wt% S3, 18-32 wt% S2U, 35-48 wt% SU2, 14-20 wt% U3
(S=saturated fatty acid with 16-18 C-atoms and U=unsaturated fatty acid with 18 C-atoms)
and which preferred fat compositions display a fatty acid composition (by FAME) of:

20-50 wt% C18:0, preferably 25-35 wt%
30-60 wt% C18:1, preferably 45-56 wt%

5-15 wt% C16:0, preferably 6-10 wt%

0-15 wt% C18:2, preferably 5-10 wt%, while the composition displays a solid fat content at the temperature indicated of:

5 N10=10-30

N20= 8-20

N30= 5-8

N35 < 5.

10 [0006] A particularly preferred fat is a fat that is obtained as a randomised, interesterified Shea oil olein. Shea oil olein is obtained as a side stream during the production of Shea oil stearin (a well known cocoa butter equivalent) from Shea oil. However so far no useful application of Shea oil olein was known, without an increase of trans fatty acids.

15 [0007] The fat according to the invention can be applied as such, however it is also possible to use blends of this fat with other fats or oils. In that instance the novel fats can act as structuring fat for the other fats. Therefore the invention also concerns blends of triglycerides, comprising 10 to 90 wt% of a fat composition according to claims 1-3 and 10 to 90 wt% of another fat, preferably selected from the group consisting of liquid oils (sunflower oil, rape seed oil, soybean oil, arachidic oil), tropical oils (coconut oil, palm kernel oil, palm oil), fractions thereof, or fully or partially hydrogenated products or interesterified mixes of them. In particular the use of the hard or fully hardened vegetable fat (fractions) leads to good results.

20 [0008] Preferred examples of other fats are fats that are liquid at ambient temperature (i.e having an N20 < 5, such as sunflower oil, soybean oil, olive oil etc.) and or having relatively high contents of C12/C14 fatty acid residues (such as coconut oil; or palm kernel fat) and/or having substantial amounts of C22 or higher fatty acid residues in it (such as arachidic oils or rape oils).

25 [0009] Another main advantage of our novel fats is that they are derived from natural fats and that thus the products obtained after interesterification are about free of trans fatty acids. Trans fatty acids are considered less healthy nowadays and thus our novel fats can be considered as healthier than the fats with a relatively high trans content. Our invention therefore is also directed to fat compositions, wherein the composition has a trans fatty acid content of less than 10 wt%, preferably less than 5 wt%, most preferably less than 2 wt%. Trans content being defined here as the total of the trans fatty acids over the total number of unsaturated bonds in the unsaturated fatty acids present.

30 [0010] Very beneficial applications of our novel fats or of blends containing them are the use of these fats or blends in icings, resulting in increased plasticity and decreased trans fatty acids compared to common icings. Icing compositions comprising

30-70 wt% of a fat

35 0-30 wt% of powder products or mass (i.e. SMP, fruit, cacao etc.)

10-60 wt% of one or more sugars or sugar alcohols or mixtures of them

0.1-3 wt% of an emulsifier, wherein the fat comprises 10-100 % of the fat according to claims 1-3.

40 [0011] Our fats can also be used successfully in margarine compositions, in particular in puff pastry margarines and in cream margarines. By using our fats or our blends puff pastry margarines can be made comprising a fat emulsion with a fat content of 40-90 wt%, wherein the fat is a fat or a fat blend according to claims 1-5, while the total emulsion displays a Stevens hardness C at 20 °C of 1000 to 4000 g., or cream margarines can be made comprising a fat emulsion with a fat content of 40-90 wt% wherein the fat is a fat or a fat blend according to claims 1-5 while the emulsion displays a Stevens hardness C at 20 °C of 400 to 1500 g. Stevens hardness being measured using a Stevens Texture analyzer with a probe of 12 mm and using a penetration speed of 1 mm/s and a penetration depth of 10 mm.

45 [0012] The fats or fat blends according to the invention can also be used for the preparation of shortenings or frying fats. Hereto some silicon additive and/or emulsifier can be incorporated into the fat or fat blend. Any known silicon additive or emulsifier can be applied, although we prefer to use types of siloxanes and/or all kinds of lecithines and/or monodiglyceride mixes. Therefore in another embodiment our invention also concerns with a shortening or a frying fat composition comprising 10 to 100 wt% of fat and at least one of: (i) silicon additives and (ii) emulsifier such that the total of (i) + (ii) > 0% and flavours in amounts of 0-1 wt% of silicon additives and/or 0-2 wt% of emulsifier and/or 0-2 wt% of flavour, wherein the fat is a fat or fat blend according to claims 1-5. Our novel fats can be obtained by the following process

55 - a natural vegetable fat or a blend of natural fats is selected with a FAME of:

20-50 wt% of C18:0

30-60 wt% of C18:1

5-15 wt% of C16:0 and

0-15 wt% of C18:2

- which fat is subjected to a randomisation using a base as catalyst
- whereupon a randomised fat is isolated from the reaction mix after washing.

According to a last embodiment our invention concerns also the use of a fat composition with the composition according to claims 1-5, wherein the composition is applied as a frying fat.

[0013] It should be noted that the N-values indicated in this application were measured on fats that were subjected to the following T-regime:

melt fat at 80 °C; adjust temperature to 60 °C; cool fat until 0 °C and keep fat at 0 °C for 60 min, heat fat to measurement temperature and keep it at this temperature for 30 min and measure N-value at the temperature indicated.

EXAMPLES

Example 1: Preparation of In SH-f from Shf:

[0014] Shea olein was neutralized and dried before interesterification (FFA after treatment less than 0,05 %, moisture less than 0,07%). Interesterification was divided into different steps:

- heating of the raw material up to 110 °C under vacuum condition
- adding 0,2 % of sodiummethylate (catalyst). Temperature was kept constant for 15 minutes under stirring conditions. During this time interesterification took place.
- cooling to 95 °C
- soap deposit by adding water
- drying under vacuum
- bleaching and deodorisation under standard conditions

[0015] Overall fame analysis on triglycerids of randomized Shea olein was carried out on triglyceride recovered from an alumina column, following the standard operating procedures.

FAME	OVERALL
C 12:0	0,4
C 14:0	0,2
C 16:0	7,8
C 16:1	0,1
C 18:0	28,1
C 18:1	53,2
C 18:2	7,9
C 18:3	0,2
C 20:0	1,1
C 20:1	0,5
C 22:0	0,1

Solids content of SH-f and inSHf:

[0016]

SOLIDS:	N10	N20	N30	N35
SHf	1,2	0,7	0,5	0,1
inSHf	15,9	9,6	15,4	3,5

Triglyceride distribution	SHf	inSHf
SSS	1,5	5,6
SOS	19,5	7,8
SSO	2,6	15,7
SLnS	4,7	1,1
SSLn	0,2	2,3
OSO	1,2	11
SOO	34,6	22
SOLn	11,7	9,7
OOO	15,3	15,5
Rest	8,7	9,3

Example 2: Preparation of blends comprising inSHf:

[0017] Fully refined and randomized sheaolein was blended with fully refined other fat components in the following ratio (wt %):

Blend	palm oil	palm-stearine mp 52	partly hardened palm-oil, mp 42	LE-rape seed oil	partly hardened LE-rapeseed oil, mp 30	rand-omized shea olein	coconut oil	palm-ker-nel oil
1		5	45	10		40		
2		60		15		25		
3	30	8	36	13		13		
4					100			
5							100	
6					90	10		
7						10		90
8						10	90	
9	60	10				30		

(continued)

Blend	palm oil	palm-stearine mp 52	partly hardened palm-oil, mp 42	LE-rape seed oil	partly hardened LE-rape seed oil, mp 30	rand-omized shea olein	coconut oil	palm-kernel oil
10	100							

[0018] These blends were used for the applications, mentioned in examples 3-6.

Example 3: Application of fat-blends in puff pastry

3.1: Preparation of puff pastry fat

[0019]

FAME	Blend 1	Blend 2
C 12:0	1,4	0,9
C 14:0	1,0	1,1
C 16:0	26,0	38,9
C 16:1	0,2	0,2
C 18:0	16,8	8,9
C 18:1	45,4	38,1
C 18:2	6,1	8,5
C 18:3	1,2	1,5
C 20:0	0,6	0,5
C 20:1	0,4	0,3
C 22:0	0,1	0,1
Trans-Fatty Acid (%)	6,6	virtually free
Solid content 20°C (N20)	38,0	39,0
Solid content 30°C (N30)	20,8	23,8
Solid content 35°C (N35)	13,9	17,4
Iodine Value	71,1	65,6

[0020] The N-values were measured by means of NMR (one hour stabilisation).

[0021] From the fat blends 1 and 2 a puff pastry margarine was manufactured. The margarine had the following composition (wt % on total composition):

Fat phase: 82 %

81,5 % fat

0,2 % Lecithine Adlec

0,3 % Mono-Di-glyceride Admul4203

trace beta-Carotine and flavour

Water phase: 18 %

17,4 water
0,4 % whey powder
0,2 % citric acid

5 [0022] The margarine was processed at laboratory scale through a conventional A-A-B sequence with a throughput of 95 l/hr., an exit temperature on the first A-unit (260 rpm) of 21 °C, an exit temperature on the second A-unit (270 rpm) of 18 °C and a packaging temperature of 24 °C. Line pressure was 30 bar. The margarine was stored at 20 °C.

[0023] Unexpected good puff pastry fats resulted, which had good plasticity to make them suitable for a lamination fat. The products exhibited the following „Stevens“ values after 1 week (12 mm probe, texture analyzer): Fat with blend 1: 3213g, fat with blend 2: 2845 g.

3.2. Preparation of puff pastries:

[0024] The resulting puff pastry margarine were used for preparing pastries according to the following method:

15 [0025] Dough composition (total weight in grams):

Flour	1000
Salt	15
Sugar	30
Water	600
Puff Pastry Fat	1000

[0026] Dough was kneaded for 3,5 minutes and rested for 10 minutes before lamination. Dough temperature 20 °C. Lamination was done in a two step procedure where after the first lamination a 10 minutes resting time was used and after the second lamination a resting time of 1 hour. From this laminated dough pastries of 35 grams were formed and baked in a conventional baking oven (Debag) for 28 minutes at 190 °C (75 % rel.moisture).

[0027] The products exhibited beneficial and advantageous results in:

- general impression
- 35 - turn-over
- patty height (Blend 1: 3,9 cm, Blend 2: 4,1 cm)

Example 4: Application of a fat blend in baking creams

40 4.1: Preparation of a cream baking fat

[0028]

FAME	Blend 3
C 12:0	0,6
C 14:0	0,9
C 16:0	35,4
C 16:1	0,4
C 18:0	9,8
C 18:1	43,1
C 18:2	7,1
C 18:3	1,1

(continued)

FAME	Blend 3
C 20:0	0,4
C 20:1	0,3
C 22:0	0,1
Trans-Fatty Acid (%)	5,8
Solid content 20°C (N20)	36,7
Solid content 30°C (N30)	18,9
Solid content 35°C (N35)	11,8
Iodine Value	51,8

[0029] The N-values were measured by means of NMR (one hour stabilisation).

[0030] From this fat blend a baking cream was manufactured. The cream had the following composition (wt% on total composition):

40,0 % Fat
 35,3 % Sugar
 20,0 % Water
 4,0 % Mono-Di-glyceride Admul 4204
 0,5 % Salt
 0,2 % Tartaric acid
 traces of colouring agents and flavours

[0031] The baking cream was processed at laboratory scale through a conventional A-A-B sequence with a throughput of 85 l/hr., an exit temperature on the first A-unit (230 rpm) of 22 °C, an exit temperature on the second A-unit (270 rpm) of 20 °C and a packaging temperature of 23 °C. Line pressure was 30 bar. The baking cream was stored at 20 °C.

[0032] The baking cream obtained had good properties to make them suitable for baking application. The product exhibited a „Stevens“ values after 1 week (12 mm probe, texture analyzer) of 1638 g.

4.2.: Preparation of Pan-baked white bread:

[0033] The baking cream was also used for preparing a Pan-baked white bread according to the following method:

[0034] Dough composition (total weight in grams):

Flour	3000
Salt	45
Yeast	240
Water	1500
Cream	720

[0035] Dough was kneaded in a spiral mixer for 8 minutes (1 min. slow, 7 min. fast) and rested for 30 minutes (two times a rough folding after 15 minutes each). Dough temperature was 26,1 °C. Prooving was done for 5 minutes at 36 °C before folding procedure and for another 45 minutes after the folding procedure. Folding procedure was only used to get the right shape of the dough by using a lamination machine. Pan-baked white bread was baked in a conventional baking oven for 35 minutes at 210 °C (75 % rel. moisture).

[0036] The baked product had an excellent general impression, especially the good volume (1900 g/l) and the

improved elasticity of the crumb is advantageous for this kind of products.

Example 5: Application of fat-blends in icings / glazers / coatings

5.1: Preparation of icings / glazers / coatings

[0037]

10

15

20

25

30

35

FAME	Blend 4	Blend 5	Blend 6	Blend 7	Blend 8
C 12:0	0,1	45,9	0,1	47,6	41,3
C 14:0	0,1	17,2	0,1	16,0	15,5
C 16:0	5,1	9,11	5,3	8,2	8,1
C 16:1	0,1	0,1	0,1	0,1	0,1
C 18:0	6,0	2,7	8,2	5,0	5,2
C 18:1	77,2	7,6	74,8	18,8	12,2
C 18:2	5,9	2,2	6,1	2,7	2,8
C 18:3	0,3	0,1	0,3	0,1	0,1
C 20:0	0,7	0,1	0,8	0,2	0,2
C 20:1	0,2	0,1	0,3	0,1	0,1
C 22:0	0,4	0,1	0,4	0,1	0,1
Trans-Fatty Acid (%)	57	virtually free	51,4	virtually free	virtually free
Solid content 20 °C (N20)	44,1	34,2	40,0	33,6	23,1
Solid content 30 °C (N30)	5,2	0,3	5,8	0,2	0,4
Solid content 35 °C (N35)	0,1	0,1	1,0	0	0

[0038] The N-values were measured by means of NMR (one hour stabilisation).

[0039] From these fat blends icings were manufactured with following composition (wt%):

40 57 % icing sugar
40 % fat.
2,5 % skim milk powder
0,5 % lecithine Bolec Z
traces of colouring agents and flavours

45

[0040] The icings were processed on a Fryma mill (angular space 0,3 mm) at 45 °C. After crystallization at 10 °C for 24 hours, the samples were stored at 20 °C.

5.2: Assessment of icings / glazers / coatings

50

[0041] The icings were analyzed concerning hardness (force) and flexibility (distance) on a texture analyzer (Stable Micro Systems). For preparation the icing was melted at 40 °C, formed into a small bar (volume 10 cm³) and stored at minus 20 °C.

[0042] Analysis of the physical properties of icings (average value of 5 measurements / 5 bars):

55

	Blend 4	Blend 5	Blend 6	Blend 7	Blend 8
Force (g)	2500	2500	2400	3500	3700
Distance (mm)	0,55	0,65	0,7	0,55	0,45

[0043] The results show that the product properties concerning flexibility and hardness can be modified by using randomized shea olein (compare blends 4 and 6; respectively blends 5 and 8). Especially the application of the randomized shea olein in a blend for icings in the ice-cream industry is advantageous because of the good flexibility at minus 20 °C.

Example 6: Application of fat-blends as frying fat

6.1: Preparation of frying fat

[0044]

FAME	Blend 9	Blend 10
C 12:0	1,1	0,2
C 14:0	1,0	1,0
C 16:0	36,8	44,2
C 16:1	0,2	0,2
C 18:0	8,3	4,3
C 18:1	42,6	39,1
C 18:2	8,5	9,9
C 18:3	0,3	0,2
C 20:0	0,5	0,4
C 20:1	0,2	0,1
C 22:0	0,1	0,1
Trans-Fatty Acid (%)	virtually free	virtually free

[0045] The components of the fat blends were mixed and used for frying analysis

6.2.: Assessment of frying fats

[0046] The fats (each 13,5 kg) were filled in a frying pan and every 2 hours 1 kg of raw French fries were added and fried at 180 °C. This was done 4 times a day for 6 days in total. Samples of the fats were analysed in laboratory.

	Blend 9	Blend 10
Start (0 hr): Free Fatty Acid (%)	0,05	0,04
Start (0 hr): Colour Lovibond Red	2,5	2,3

(continued)

	Blend 9	Blend 10
Start (0 hr): Colour Lovibond Yellow	26,0	25,0
Start (0 hr): Smoke point (°C)	224	228
Start (0 hr): apolar parts (%)	90,7	91,8
24 hr: Free Fatty Acid (%)	0,29	0,31
24 hr: Colour Lovibond Red	4,3	2,7
24 hr: Colour Lovibond Yellow	58,0	35,0
24 hr: Smoke point (°C)	192	172
24 hr: apolar parts (%)	78,5	74,7
48 hr: Free Fatty Acid (%)	0,70	0,72
48 hr: Colour Lovibond Red	n.d.	6,2
48 hr: Colour Lovibond Yellow	n.d.	> 70
48 hr: Smoke point (°C)	188	168
48 hr: apolar parts (%)	67,5	64,0

[0047] Results show that by using randomized shea olein (=blend the frying properties can be improved. Especially the chemical decomposition and polymerisation of the fat components is lowered compared to a standard frying fat (blend 10) resulting in a better smoke point.

[0048] Although from a chemical point of view the use of randomized shea olein is advantageous, the change in colour is different compared to the standard frying fat. Nevertheless the fried product (French fries) did not have any off-taste or colouring defect.

Claims

1. Fat composition having a triglyceride composition, corresponding with a randomized, interesterified fat having a fatty acid composition of:

20-50 wt% C18 : 0
 30-60 wt% C18 : 1
 5-15 wt% C16 : 0 and
 0-15 wt% C18 : 2

2. Fat composition according to claim 1, wherein the composition comprises

4 to 10 wt% of SSS
 5 to 15 wt% of SUS
 10 to 20 wt% of SSU
 15 to 30 wt% of SUU
 8 to 20 wt% of USU
 12 to 30 wt% of UUU-triglycerides

preferably 4-8 wt% S3, 18-32 wt% S2U, 35-48 wt% SU2, 14-20 wt% U3

S=saturated fatty acid with 16-18 C-atoms and U=unsaturated fatty acid with 18 C-atoms and displaying a fatty acid composition (by FAME) of:

20-50 wt% C18:0, preferably 25-35 wt%
 30-60 wt% C18:1, preferably 45-56 wt%
 5-15 wt% C16:0, preferably 6-10 wt%

0-15 wt% C18:2, preferably 5-10 wt%, while the composition displays a solid fat content at the temperature indicated of:

N10=10-30

N20= 8-20

N30= 5-8

N35 < 5

3. Fat composition according to claims 1-2, wherein the composition is randomized, interesterified Shea olein.
4. Blend of triglycerides comprising 10 to 90 wt% of a fat composition according to claims 1-3 and 10 to 90 wt% of another fat, preferably selected from the group consisting of liquid oils (sunflower oil, rape seed oil, soybean oil, arachidic oil), tropical oils (coconut oil, palm kernel oil, palm oil), fractions thereof, or fully or partially hydrogenated products or interesterified mixes of them.
5. Fat composition according to claims 1-4, wherein the composition has a trans fatty acid content of less than 10 wt%, preferably less than 5 wt%, most preferably less than 2 wt%.
6. Icing composition comprising:
 - 30-70 wt% of a fat
 - 0-30 wt% of powder products or mass (i.e. SMP, fruit, cacao etc.)
 - 10-60 wt% of one or more sugars or sugar alcohols or mixtures of them
 - 0.1-3 wt% of an emulsifier, wherein the fat comprises 10-100 % of the fat according to claims 1-3.
7. Puff pastry margarine comprising a fat emulsion with a fat content of 40-90 wt%, wherein the fat is a fat or a fat blend according to claims 1-5, while the total emulsion displays a Stevens hardness C at 20 °C of 1000 to 4000 g.
8. Cream margarine, comprising a fat emulsion with a fat content of 40 -90 wt% wherein the fat is a fat or a fat blend according to claims 1-5 while the emulsion displays a Stevens hardness C at 20 °C of 400 to 1500 g.
9. Shortening and frying fat composition comprising 10 to 100 wt% of fat and at least one of silicon additives and emulsifier in amounts of 0-1 wt% of silicon additives and/or 0-2 wt% of emulsifier, wherein the fat is a fat or fat blend according to claims 1-5.
10. Process for the preparation of a fat with the composition according to claims 1-5 wherein;
 - a natural vegetable fat or a blend of natural fats is selected with a FAME of:
 - 20-50 wt% of C18:0
 - 30-60 wt% of C18:1
 - 5-15 wt% of C16:0 and
 - 0-15 wt% of C18:2
 - which fat is subjected to a randomisation using a base as catalyst
 - whereupon a randomised fat is isolated from the reaction mix after washing.
11. Use of a fat composition with the composition according to claims 1-5, wherein the composition is applied as a frying fat.



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 20 0721

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. CL.7)
X	US 4 214 012 A (AINGER ET AL.) 22 July 1980 (1980-07-22)	1	A23D9/00
A	* example 8; table IV *	2-5	C11C3/10
X	--- "Bailey's industrial oil & fat products, fifth edition, vol. 3 - Edible oil and fat products: products and application technology" 1996, JOHN WILEY & SONS, INC., NEW YORK, NY, US XP002112226 * page 382; table 9.12 * * column SAL *	1	A23G3/00
A	--- EP 0 519 542 A (UNILEVER) 23 December 1992 (1992-12-23) * claims; examples *	1-5	
D, A	--- EP 0 069 599 A (UNILEVER) 12 January 1983 (1983-01-12) * example 1 *	1-5	
D, A	--- EP 0 815 738 A (UNILEVER) 7 January 1998 (1998-01-07) * claims *	1-11	TECHNICAL FIELDS SEARCHED (Int. CL.7)
A	--- EP 0 245 076 A (UNILEVER) 11 November 1987 (1987-11-11) * the whole document *	1, 2	A23D C11C A23G
A	--- US 5 190 868 A (KOKUSHO ET AL.) 2 March 1993 (1993-03-02) * example 15 *	1, 3	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 June 2000	Examiner Lepretre, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503/03 82 (P04001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 20 0721

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-06-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4214012 A	22-07-1980	GB 1382573 A	05-02-1975
		AT 337520 B	11-07-1977
		AT 7872 A	15-10-1976
		AU 473397 B	24-06-1976
		AU 3756372 A	05-07-1973
		BE 777783 A	02-05-1972
		CA 956503 A	22-10-1974
		CH 567369 A	15-10-1975
		DE 2200461 A	10-08-1972
		ES 398640 A	16-06-1975
		FR 2121601 A	25-08-1972
		IE 35950 B	07-07-1976
		IT 1048393 B	20-11-1980
		NL 7200156 A,B,	10-07-1972
		SE 381554 B	15-12-1975
		US 4292338 A	29-09-1981
		ZA 7200057 A	29-08-1973
EP 519542 A	23-12-1992	NONE	
EP 69599 A	12-01-1983	AT 22113 T	15-09-1986
		AU 553171 B	03-07-1986
		AU 8682282 A	02-02-1983
		CA 1241227 A	30-08-1988
		DE 3273180 D	16-10-1986
		DK 112383 A,B,	07-03-1983
		ES 513828 D	16-08-1983
		ES 8308356 A	16-11-1983
		WO 8300161 A	20-01-1983
		IE 53399 B	09-11-1988
		JP 1039757 B	23-08-1989
		JP 58501066 T	07-07-1983
		MY 35387 A	31-12-1987
EP 815738 A	07-01-1998	SG 21187 G	19-02-1988
		ZA 8204872 A	29-02-1984
EP 815738 A	07-01-1998	CA 2207358 A	26-12-1997
		JP 10056964 A	03-03-1998
		US 5935627 A	10-08-1999
EP 245076 A	11-11-1987		
		GB 2190394 A	18-11-1987
		AU 596411 B	03-05-1990
		AU 7248187 A	12-11-1987
		JP 4030836 B	22-05-1992
		JP 63017697 A	25-01-1988
		SE 467860 B	28-09-1992

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 20 0721

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-06-2000

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 245076	A		SE	8701847 A	07-11-1987
			ZA	8703239 A	25-01-1989
US 5190868	A	02-03-1993	JP	1137988 A	30-05-1989
			JP	2719667 B	25-02-1998
			DE	3853656 D	01-06-1995
			DE	3853656 T	18-01-1996
			EP	0305901 A	08-03-1989



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/451,606	06/13/2006	Anthony George Herzing	059490-5034

CONFIRMATION NO. 9635

9629
MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC20004

Title: Fat composition

Publication No. US-2007-0286940-A1

Publication Date: 12/13/2007

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publicly available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Pre-Grant Publication Division, 703-605-4283



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	DRAWINGS	TOT CLAIMS	IND CLAIMS
11/451,606	06/13/2006	1761	1430	059490-5034		26	1

CONFIRMATION NO. 9635

9629
MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004

UPDATED FILING RECEIPT

Date Mailed: 01/25/2007

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Anthony George Herzog, Channahon, IL;
Gerald Patrick McNeill, Channahon, IL;
Harold Kazier, Channahon, IL;

Assignment For Published Patent Application

Loders Croklaan USA LLC

Power of Attorney: The patent practitioners associated with Customer Number 09629

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 12/13/2006

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is
US11/451,606

Projected Publication Date: 12/13/2007

Non-Publication Request: No

Early Publication Request: No

Title

Fat composition

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the

subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).



PATENT
ATTORNEY DOCKET NO.: 059490-5034

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Tony HERZING, et al.

Application No.: 11/451,606

Filed: June 13, 2006

For: FAT COMPOSITION

Confirmation No.: 9635

Group Art Unit: 1761

Examiner: Unknown

Commissioner for Patents

MAIL STOP MISSING PARTS

RESPONSE TO NOTICE TO FILE MISSING PARTS
(Application filed on or after December 8, 2004)

1. This replies to the Notice to File Missing Parts of Nonprovisional Application mailed December 13, 2006.

A copy of the Notice To File Missing Parts Of Nonprovisional Application is enclosed.

2. Declaration Or Oath and Power of Attorney

- ☒ No declaration or oath and Power of Attorney was filed. Enclosed are the original Declaration and Power of Attorney.
- ☐ The specification attached to the declaration is a copy of the specification and any amendments thereto which were filed in the PTO to obtain the filing date.
- ☐ The declaration or oath which was filed was determined to be defective. A new original Combined Declaration and Power of Attorney is attached.

3. English Translation of Non-English Language Papers

- ☐ Submitted herewith is a verified English translation of the non-English language application papers as originally filed. It is requested that this translation be used as the copy for examination purposes in the PTO.

Also enclosed is the Verification of Translation Document.

4. Small Entity Status

- ☐ Small entity status under 37 C.F.R. § 1.27 is asserted for the present application.

5. Extension of Time

The proceedings herein are for a patent application and the provisions of 37 C.F.R. § 1.136(a) apply.

- ☐ Applicant petitions for an extension of time, the fees for which are set out in 37 C.F.R. § 1.17(a), for the total number of months checked below:

Total months requested	Fee for extension	Fee for Small Entity
☐ one month	\$ 120.00	\$ 60.00
☐ two months	\$ 450.00	\$225.00
☐ three months	\$1,020.00	\$510.00

Extension of time fee due with this request: \$ _____

If an additional extension of time is required, please consider this a Petition therefor.

- ☒ Applicant believes that no extension of time is required. However, in the event applicant has inadvertently overlooked the need for a petition and fee for extension of time, applicant hereby petitions for such an extension and requests that any fee therefor be charged to our Deposit Account No. 50-0310.

6. Assignment

- ☒ An assignment of the invention to Loders Crokiaan USA LLC and a PTO Form-1595, Recordation Form Cover Sheet, are enclosed.

7. Fee Calculation

				Fee Code
Basic Fee-\$300/\$150				\$300.00 1011/2011
	Number Filed	Number Extra	at a Rate of (Lg./Sm.Entity)	
Total Claims	26 - 20 =	6	\$50/\$25 each=	\$300.00 1202/2202
Independent Claims	5 - 3 =	2	\$200/\$100 each=	\$ 1201/2201
Multiple dependent claim(s), if any			\$360/\$180	\$ 1203/2203
Application Size Fee - \$250.00 for each additional 50 sheets that exceed 100=			\$	\$ 1081/2081
Search Fee			\$500/\$250	\$500.00 1111/2111
Examination Fee			\$200/\$100	\$200.00 1311/2311
SUB-TOTAL =				\$
Late Filing Surcharge Fee (37 C.F.R. § 1.16(e))			\$130/\$65	\$130.00 1051/2051
Extension Fee (37 C.F.R. § 1.17(a)(1)-(5))			\$120/\$60 (1 Month)	1251/2251
			\$450/\$225 (2 Months)	1252/2252
			\$1020/\$510 (3 Months)	1253/2253
			\$1590/\$795 (4 Months)	1254/2254
			\$2160/\$1080 (5 Months)	\$ 1255/2255
SUB-TOTAL =				\$1,430.00
Fee For Application Filed With A Non-English Specification (37 C.F.R. § 1.17(i) and § 1.52(d))			\$130.00	\$ 1053
Assignment Recordation Fee			\$ 40.00	\$40.00 8021
TOTAL FILING FEE =				\$1,470.00

8. Fee Payment

- ☐ Enclosed is a check in the amount of \$_____ representing the total fee due.
- ☒ The Commissioner is hereby authorized to charge the total fee due to Deposit Account 50-0310.
- ☒ **Except** for issue fees payable under 37 C.F.R. §1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §1.16 and §1.17 which may be required, or credit any overpayment to Deposit Account No. 50-0310.

9. Additional papers enclosed.

- ☐ Preliminary Amendment
- ☐ Submission of Replacement Drawings with sheets of drawings
- ☐ Submission of Priority Document
- ☒ Submission of Replacement Specification
- ☒ Replacement Specification, consisting of 1 independent claim and 26 total claims
- ☐ Certified copy(ies) of priority document(s): _____
- ☒ Supplemental Disclosure Statement
- ☒ Form PTO-1449, 4 references listed, and 3 references provided
- ☐ Declaration of Biological Deposit
- ☐ Submission of "Sequence Listing
- ☐ Other: _____

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

Paul N. Kokulis, Reg. No. 16,773

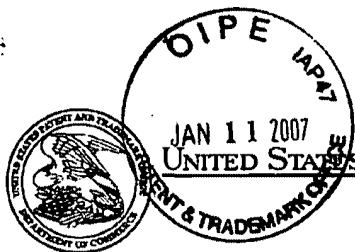
Date: January 11, 2007**CUSTOMER NO. 09629****MORGAN, LEWIS & BOCKIUS LLP**

1111 Pennsylvania Avenue, N.W.

Washington, D.C. 20004

Telephone: (202) 739-3000

Facsimile: (202) 739-3001



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/451,606	06/13/2006	Tony Herzing	059490-5034

09629
 MORGAN LEWIS & BOCKIUS LLP
 1111 PENNSYLVANIA AVENUE NW
 WASHINGTON, DC 20004

CONFIRMATION NO. 9635

FORMALITIES
 LETTER

Date Mailed: 12/13/2006

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

01/12/2007 SZEWDIE1 00000099 500310 11451606

Filing Date Granted

01 FC:1011	300.00 DA
02 FC:1051	130.00 DA
03 FC:1111	500.00 DA
04 FC:1311	200.00 DA
05 FC:1202	300.00 DA

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 300 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is missing. *A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.*
Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be accompanied by a marked up copy as set forth in 37 CFR 1.125(c) and a statement that the specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
 - Papers must be legibly written either by a typewriter or mechanical printer in permanent ink or its equivalent in portrait orientation on flexible, strong, smooth, non-shiny, durable, and white paper. The text must be written in a nonscript type font (e.g., Arial, Times Roman, or Courier, preferably a font size of 12) lettering style having capital letters that should be at least 0.3175 cm. (0.125 inch) high. A font with capital letters smaller than 0.3175 cm. (0.125 inch) high is only acceptable if the writing is

RECEIVED

DEC 15 2006

MORGAN, LEWIS & BOCKIUS LLP

clear and legible. Application papers must be presented in a form having sufficient clarity and contrast between the paper and the writing thereon to permit the direct reproduction of readily legible copies in any number by use of photographic, electrostatic, photo-offset, and microfilming processes and electronic reproduction by use of digital imaging and optical character recognition. Pages All are not in compliance with 37 CFR 1.52(a) or (b).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of **\$300** as a non-small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.
- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$1430** for a non-small entity

- **\$300** Statutory basic filing fee.
- **\$130** Surcharge.
- The application search fee has not been paid. Applicant must submit **\$500** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit **\$200** to complete the examination fee for a non-small entity.
- Total additional claim fee(s) for this application is **\$300**
 - **\$300** for 6 total claims over 20.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

he

Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199, or 1-800-972-6382
PART 2 - COPY TO BE RETURNED WITH RESPONSE



PATENT
ATTORNEY DOCKET NO. 059490-5034-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
	)	
Inventor(s): Anthony George HERZING et al.	)	
	)	
Application No.: 11/451,606	)	Group Art Unit: 1761
	)	
Filed: June 13, 2006	)	Examiner: unassigned
	)	
For: FAT COMPOSITION	)	

SUBMISSION OF REPLACEMENT SPECIFICATION

Commissioner for Patents
U.S. Patent and Trademark Office
Customer Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

In response to the objection noted in the Notice to File Missing Parts dated December 13, 2006, the applicants submit herewith a replacement copy of the application as filed, including the original specification, claims and abstract. The attachment is a better copy of the application as filed but is identical therewith and includes no amendments. The attached specification is thought to obviate the objections to the specification as originally filed and to otherwise satisfy all formal requirements.

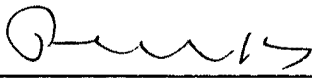
As no changes have been made in the application as filed, a marked-up copy of the specification is not required. The undersigned confirms that the attached specification contains no new matter.

Entry of the attached as a replacement for the specification, claims and abstract as initially filed is requested.

The required declaration along with the required fees and a disclosure statement are being filed herewith.

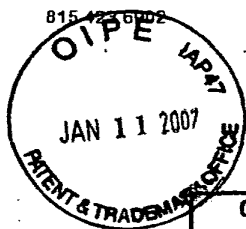
Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

By: 
Paul N. Kokulis
Reg. No. 16,773

Dated: January 11, 2007

Customer No. 09629
MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
(202) 739-3000



COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

ATTORNEY DOCKET NO.: 059490-5034

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

FAT COMPOSITION

The specification of which:

is attached hereto; or

was filed as United States application Serial No. ___ on June 13, 2006 and was amended on ___ (if applicable); or

was filed as PCT international application Number ___ on ___ and was amended under PCT Article 19
 On ___ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the U.S. Patent and Trademark Office information which is material to the patentability of claims presented in this application in accordance with Title 37, Code of Federal Regulations Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate or Section 365(a) of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign applications(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

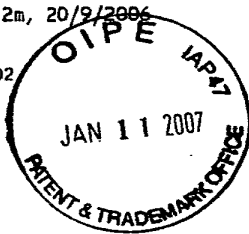
PRIOR FOREIGN APPLICATION(S):

COUNTRY (if PCT, indicate PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED
			Yes No
			Yes No
			Yes No
			Yes No

1632828v2
 I-WA02583071.1

Page 1 of 3

Best Available Copy



Combined Declaration for Patent Application and Power of Attorney - (Continued) (Includes Reference to PCT International Applications) ATTORNEY DOCKET NO.: 059490-5034				
I hereby claim the benefits under Title 35, United States Code Section 119(e) of any United States provisional application(s) listed below.				
U.S. PROVISIONAL APPLICATIONS				
U.S. PROVISIONAL APPLICATION NO.		U.S. FILING DATE:		
I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) or Section 365(e) of any PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to the patentability of claims presented in this application in accordance with Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:				
PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT:				
U.S. OR PCT INTERNATIONAL APPLICATIONS		STATUS (Check One)		
APPLICATION NO.	FILING DATE	PATENTED	PENDING	ABANDONED
POWER OF ATTORNEY: As a named inventor, I hereby appoint the registered practitioners of Morgan, Lewis & Bockius LLP included in the Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and direct that all correspondence be addressed to that Customer Number. Customer Number: 09629				
Direct Telephone Calls To: 202-739-3000				

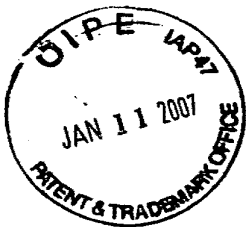
Combined Declaration for Patent Application and Power of Attorney - (Continued) (includes Reference to PCT International Applications) ATTORNEY DOCKET NO.: 059490-5034		
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.		
FULL NAME OF SOLE OR FIRST INVENTOR	Anthony George HERZING	
RESIDENCE & CITIZENSHIP	Channahon, Illinois	COUNTRY OF CITIZENSHIP USA
POST OFFICE ADDRESS	c/o Lodars Crokisan USA LLC 24708 West Durkee Road, Channahon, Illinois 60410-5249, USA	
FIRST OR SOLE INVENTOR'S SIGNATURE	DATE 9/20/06	
FULL NAME OF SECOND INVENTOR	Gerald Patrick McNEILL	
RESIDENCE & CITIZENSHIP	Channahon, Illinois	COUNTRY OF CITIZENSHIP Ireland
POST OFFICE ADDRESS	c/o Lodars Crokisan USA LLC 24708 West Durkee Road, Channahon, Illinois 60410-5249, USA	
SECOND INVENTOR'S SIGNATURE	DATE 9/20/06	
FULL NAME OF THIRD INVENTOR	Harold KAZIER	
RESIDENCE & CITIZENSHIP	Channahon, Illinois	COUNTRY OF CITIZENSHIP USA
POST OFFICE ADDRESS	c/o Lodars Crokisan USA LLC 24708 West Durkee Road, Channahon, Illinois 60410-5249, USA	
THIRD INVENTOR'S SIGNATURE	DATE 9/20/06	

Listing of Inventors Continued on attached page(s): Yes No

Page 3 of 3

1632E28v2
1-WA2583071.1

Best Available Copy



FAT COMPOSITION

This invention relates to a fat composition. In particular, the invention relates to a vegetable fat composition comprising glycerides and to its applications in baked products and iced confectionery products.

Many food products contain fats. Due to perceived health benefits, there is a desire amongst consumers for food products that have a low content of trans fatty acids and a low content of saturated fatty acids (SAFA). In order to achieve these aims, it is necessary to modify the triglyceride composition of the fats. However, this is a complex problem since most fats rely on the fatty acids of the component triglycerides, for example the saturated fatty acids, in order to achieve the correct balance of organoleptic properties. Simply lowering the SAFA content of the fat will not necessarily lead to a product that is acceptable to the consumer.

Triglyceride fats are often characterized in terms of their fatty acid content. The term fatty acid generally refers to straight chain carboxylic acids having from 12 to 24 carbon atoms and is used herein to refer to the carboxylic acid residues bound to the glycerol moiety in the triglyceride, and not to free carboxylic acid. Typically, the abbreviation S is used to denote a saturated fatty acid residue having 16 to 24 carbon atoms and U denotes an unsaturated fatty acid residue having at least 18 carbon atoms. Thus, for example, a pure triglyceride containing three saturated fatty acid residues is denoted SSS (or S_3) and a triglyceride having saturated fatty acids at the 1 and 3 positions and an unsaturated fatty acid at the 2-position is denoted SUS. S_2U refers to combined SSU and SUS, and SU_2 refers to combined SUU and USU.

Examples of fat compositions for use in food products are disclosed in the following documents.

US 5939114 describes ice cream coating compositions containing triglyceride fats. The fats have a low level of UUU triglycerides of less than 10 % by weight.

EP-A-0815738 discloses non-trans, non-temper filling fats. In the examples, the fats have a SSS content of less than 6 % by weight and a SUS content of greater than 20 % by weight.

5 WO 95/07619 relates to healthy fat spreads. The fats contain relatively high levels of C₁₈ to C₂₄ fatty acid residues.

EP-A-0731645 describes healthy fat-containing blends having an SU₂ content of at least 40 % by weight.

10

EP-A-0728415 discloses heat-set, flour-based products containing a fat. The fat has an SUS content of 35-80 % by weight.

15

US 5288513 relates to non-temper filling fats comprising a fat blend. The fat has a SSS content of less than 5 % by weight.

EP-A-0783250 describes flexible ice cream coating compositions comprising a sugar and a fat. The fat has an SUS content of 25 to 80 % by weight.

20 US 5271950 discloses chocolate compositions. In the examples, the compositions have a relatively high level of C₁₈ to C₂₄ fatty acid residues.

25 WO 96/31240 relates to a method of increasing the HDL concentration and the HDL/LDL concentration ratio in human serum by providing a balance between a sufficient and required proportion of cholesterol-free saturated fatty acids in the daily diet.

US 20050142275 describes non-lauric, non-trans, non-temper fat compositions that have relatively high levels of arachidic and behenic acids.

30

Our copending applications, US Serial Nos 10/986,044 and 10/972,615 relate to frying fats and oils and to coating compositions for bakery products, respectively.

There remains a need for good quality bakery fats with low trans content and low saturated fatty acid (SAFA) content.

According to the invention in a first aspect, there is provided a vegetable fat
5 composition comprising glycerides, wherein the triglyceride content of the composition is:

6 to 20 % SSS,
5 to less than 20 % SUS
10 5 to less than 25 % SSU
10 to 39 % SU₂ and
at least 20 % U₃,

wherein S is a saturated fatty acid residue having 16 to 24 carbon atoms and U is
15 an unsaturated fatty acid residue having at least 18 carbon atoms and all percentages are by weight based on the total triglycerides present in the composition,

the weight ratio SUS/SSU is between 0.5 and 2.0,
20

the weight ratio of (saturated fatty acid residues having 18 to 24 carbon atoms) /
(saturated fatty acid residues having 16 carbon atoms) in the total S content of the triglycerides is less than 0.2,

25 and the triglycerides contain less than 3 % of arachidic and behenic acid residues based on the total fatty acid residue content of the triglycerides,

and wherein the saturated fatty acid residue content of the triglycerides is less than
45 % by weight of the total fatty acid residues in the triglycerides.
30

It will be understood that S and U may be single fatty acids residues or, more typically, mixtures of different fatty acid residues.

In a second aspect, the invention provides a method of producing a baked product which comprises preparing a mixture and baking the mixture, and which comprises the step of incorporating the composition of the invention in the mixture.

5

A third aspect of the invention is a method of producing an iced confectionery product which comprises applying to a baked product an icing comprising the composition of the invention.

10 A further, fourth aspect of the invention is the use of the composition of the invention as an ingredient in baking.

A fifth aspect of the invention is a bakery composition comprising the composition of the invention and one or more other baking ingredients.

15

The invention also provides, in a sixth aspect, an icing composition comprising the composition of the invention, sugar and water.

A seventh aspect of the invention is a baked product comprising the composition
20 of the invention.

In a further, eighth aspect, the invention provides a method of producing the composition of the invention, which comprises blending a mixture of fats including (i) an interesterified palm olein with an iodine value of 45 to 70 and (ii)
25 a palm oil fraction with an SUS-content of less than 50 wt% and an SSS-content of at least 20%.

The present invention is based on the finding of a fat composition which has particularly beneficial properties when used in bakery applications and in
30 confectionery icing. The composition has a low SAFA and a low trans fatty acid content and yet can have desirable organoleptic properties, including structure and appearance of the finished product and mouth feel. The composition can also be produced economically on a commercial scale.

The composition of the invention may be produced as a blend of fats including (i) an interesterified palm olein with an iodine value of 45 to 70 and (ii) a palm oil fraction with an SUS-content of less than 50 wt% and an SSS-content of at least 20 wt%. For example, the blend of fats may include (i) an interesterified palm olein with an iodine value of 50 to 70 and (ii) a palm oil fraction with an SUS-content of less than 40 wt% and an SSS-content of at least 25 wt%. More preferably, the blend is a blend of at least three components, further comprising a liquid oil. Suitable liquid oils include canola oil.

The composition of the invention preferably has a S_2U content of less than 35 % by weight, more preferably less than 30 % by weight, such as from 24 to 28 % by weight. Typically, SUS content is from 10 to 18 % by weight (such as from 12 to 16 % by weight). The content of SSU is typically 8 to 16 % by weight (such as from 10 to 14 % by weight).

The S_3 content of the composition of the invention is preferably greater than 8 %, such as from 8 to 12 % by weight.

The SU_2 content of the composition is preferably from 15 to 30 % by weight, more preferably from 20 to 24 % by weight. The USU content is typically from 2 to 6 % by weight. The SUU content is typically from 10 to 25 % by weight, such as from 16 to 20 % by weight.

The U_3 content of the composition is preferably from 30 to 50 % by weight, such as from 35 to 45 % by weight.

The weight ratio of S_2Ln to S_2O in the compositions of the invention (where Ln is linoleic acid (C18:2) and O is U other than Ln) is preferably less than 0.40, more preferably less than 0.30.

The weight ratio of (saturated fatty acid residues having 18 to 24 carbon atoms) / (saturated fatty acid residues having 16 carbon atoms) in the total S content of the triglycerides in the compositions of the invention is preferably less than 0.15.

- 5 Fatty acids (and their residues) are sometimes expressed in the form $C_x:y$, where x is the number of carbon atoms in the fatty acid (or residue) and y is the number of carbon-carbon double bonds.

10 The preferred C16:0 fatty acid content of the composition is from 20 to 40 % by weight, preferably from 25 to 35 % by weight. Preferably, the composition has a C18:1 content of from 30 to 60 % by weight, such as from 40 to 50 % by weight. The C18:2 content is preferably from 6 to 20 % by weight, such as from 10 to 16 % by weight. The preferred C18:0 content of the composition is less than 5 % by weight, such as from 2 to 4 % by weight. All percentages of fatty acids are based
15 on the weight of the total fatty acid residues in the triglycerides.

The triglycerides of the composition of the invention contain less than 3 % of arachidic and behenic acid residues based on the total fatty acid residue content of the triglycerides. Preferably, they contain less than 2 % or less than 1 % by
20 weight of arachidic and behenic acid residues.

The saturated fatty acid residue (SAFA) content of the triglycerides in the composition of the invention is preferably less than 40 % by weight of the total fatty acid residues in the triglycerides. The preferred total content of
25 polyunsaturated C18:2 and C18:3 fatty acid residues is preferably less than 25 % by weight, more preferably less than 20 % by weight, such as 10 to 20 % by weight of the total fatty acid residues in the triglycerides. The preferred total content of monounsaturated C18:1 and C20:1 fatty acid residues is preferably from 35 to 60 % by weight, more preferably from 40 to 50 % by weight, based on
30 the total fatty acid residues in the triglycerides.

In a preferred embodiment of the invention, the triglyceride content of the composition is:

- 8 to 15 % SSS,
11 to 18 % SUS
8 to 16 % SSU
5 18 to 25 % SU₂ and
at least 35 % U₃.

wherein all percentages are by weight based on total triglycerides.

- 10 The composition of the invention preferably has an N₁₀ of 20 to 50, more preferably from 30 to 40. Additionally or alternatively, the composition preferably has an N₂₀ of 10 to 35, more preferably from 15 to 30. Additionally or alternatively, the composition preferably has an N₃₀ of less than 18, more preferably from 3 to 15. These N values are based on unstabilised fats. Thus, the
15 term Nx refers to solid fat content, measured by NMR pulse techniques on unstabilized fats. Unstabilized meaning that the fat was melted at 80 °C, kept at 60 °C for 5 minutes, cooled to 0 °C, kept at 0 °C for 1 hour and kept at measurement temperature for 30 minutes.
- 20 Preferably, the composition of the invention is essentially free of *trans* fatty acid residues. For example, the composition may contain *trans* fatty acid residues in the triglycerides in an amount of less than 1 % by weight, more preferably less than 0.5 % by weight, such as less than 0.1 % by weight. Typically, the only *trans* fatty acid residues present in the compositions will be the low levels that occur in
25 the natural products from which the composition is preferably derived.

- The compositions of the invention are vegetable fats. By this, we mean that the fat compositions are principally or wholly derived from fats from vegetable sources, either directly or indirectly, rather than being derived from animals.
- 30 Typically, the compositions of the invention will comprise at least 50 % by weight of fats derived from vegetable sources, more preferably at least 60 % by weight, such as at least 70 %, at least 80 %, at least 90 % , at least 95 % or even 100 % by weight.

The compositions of the invention may be produced by blending commercially available fats. For example, the compositions may be produced by a method which comprises blending a mixture of fats including (i) an interesterified palm olein with an iodine value of 45 to 70 and (ii) a palm oil fraction with an SUS-
5 content of less than 50 wt% and an SSS-content of at least 20 wt%. An example of (i) is interesterified palm oleine having an iodine value of 55. An example of (ii) is palm stearine having an iodine value of 35. Preferably the mixture of fats is a blend of at least three components, further comprising a liquid oil, such as
10 canola oil. The amounts of the components of the blend are selected so as to achieve the desired triglyceride composition. When a three component blend of (i), (ii) and liquid oil is used, the weight amounts are typically 20 to 50 % (more preferably 30 to 40 %) liquid oil, 30 to 50 % (more preferably 38 to 48 %) of (i) and 10 to 30 % (more preferably 15 to 25 %) of (ii). General methods of blending
15 fats, and apparatus for this purpose, are well known in the art.

Compositions of the invention may be used as shortening in bakery products or as components of icing compositions for confectionery. Compositions of the invention may impart one or more beneficial properties to the finished product
20 including mouthfeel, appearance, structure (including, for baked products, crumb firmness) and/or aeration.

For shortening, the compositions may be used alone or in combination with one or more conventional fats. Preferably, the compositions are used alone. Bakery
25 products are typically baked in an oven and include cakes, cookies, biscuits, buns and bread.

Bakery compositions of the invention comprise the composition of the invention and one or more other baking ingredients, such as flour or baking colourants or
30 preservatives.

Icing compositions of the invention comprise the composition of the invention, sugar (e.g., sucrose) and water. The compositions are typically used to apply a

partial or complete coating of icing to confectionery products such as cakes, buns, cookies or biscuits. The icing compositions optionally comprise one or more flavouring agents and/or one or more colourants and may comprise one or more other fats.

5

All publications, patents and patent applications are incorporated herein by reference. While in the foregoing specification this invention has been described in relation to certain preferred embodiments thereof, and many details have been set forth for purposes of illustration, it will be apparent to those skilled in the art that the invention is susceptible to additional embodiments and that certain of the details described herein may be varied considerably without departing from the basic principles of the invention.

10

The following non-limiting examples illustrate the invention and do not limit its scope in any way. In the examples and throughout this specification, all percentages, parts and ratios are by weight unless indicated otherwise. Fatty acid (residue) contents are expressed by weight based on the weight of the total fatty acid residues in the triglycerides, calculated as free (i.e., hydrolysed) fatty acids. Triglyceride contents are expressed by weight based on the weight of total triglycerides present in the composition.

15

20

Examples

Example 1

25 Preparation of reduced saturate shortening

30

A reduced saturate fat blend according to the invention was prepared by blending together three components: (1) commercially available refined, bleached and deodorized canola oil purchased locally; (2) commercially available refined, bleached deodorized palm stearine with an iodine value of 35, obtained from Loders Croklaan USA (Channahon, IL); and (3) commercially available fully interesterified palm olein with an iodine value of 55 (refined, bleached and deodorized), obtained from Loders Croklaan USA.

The components were melted and blended together in a tank to a final weight of 91 kg (200 pounds) according to the formula below:

5	Canola Oil	33 kg (72 lbs)
	Palm Stearine (IV35)	19 kg (42 lbs)
	Interesterified Palm Oleine (IV55)	39 kg (86 lbs)

10 The blend was stirred to fully mix the components and passed through three cooling tubes with agitation to crystallize the blend into a smooth, semi-solid mass suitable for use as a bakery shortening. This product was then evaluated for functionality in baked goods.

Analysis

15

The product of Example 1 has the following calculated triglyceride composition:

	Weight %
SSS	10
SUS	14
SSU	12
USU	4
SUU	18
UUU	42

In more detail, the composition is as follows:

20

	Weight %
SSS	10
SOS	11
SSO	9
SLnS	3
SSLn	3
OSO	4
SOO	11

SOLn	7
OOO	19
3+	23

The following is the calculated fatty acid content of the product:

	Weight %
C14:0	1
C16:0	31
C18:0	3
C18:1	46
C18:2	13
C18:3	4
C20:1	1
Others	1

5

The calculated N Values (unstabilised) of the product are:

	%
N10	37.08
N20	23.89
N25	18.41
N30	13.69
N35	9.62
N40	6.72

Example 2

10 Evaluation of reduced saturate bakery shortening prepared in Example 1

15 A cookie was prepared with the shortening from Example 1. This was almost indistinguishable in texture and mouthfeel from cookies made with a high saturate shortening (50 % saturates). The advantage over a simple blend of canola oil and palm stearine (IV35) with 35% saturates, was the ability of the shortening to cream with the sugar and maintain aeration. Finished cookies prepared with

simple blends lacked desired structure, exhibited excess spread, crumb firmness (lack of tenderness) and had greasy/oily mouthfeel.

Example 3

5 Use of blend of Example 1 in cake icing

Cake icing was prepared by blending the reduced saturated shortening from Example 1 with confectionery sugar, shortening and water, followed by aeration in a Hobart mixer. The icing was comparable to a high saturate shortening (50 %
10 saturates) with respect to texture and degree of aeration (as measured by specific gravity) immediately after manufacture and during subsequent storage.

For comparison, another formula with reduced saturates (also approximately 35 % saturates) was made from a simple blend of canola oil and palm stearine (IV35)
15 that was solidified according to Example 1. Icings prepared with this blend aerated well initially, but quickly lost structure and aeration during storage. As a result, this icing had an undesirable shiny/oily appearance and a gritty mouthfeel.

CLAIMS

1. A vegetable fat composition comprising glycerides, wherein the triglyceride content of the composition is:

5

6 to 20 % SSS,

5 to less than 20 % SUS

5 to less than 25 % SSU

10 to 39 % SU₂ and

10

at least 20 % U₃,

wherein S is a saturated fatty acid residue having 16 to 24 carbon atoms and U is an unsaturated fatty acid residue having at least 18 carbon atoms and all percentages are by weight based on the total triglycerides present in the composition,

15

the weight ratio SUS/SSU is between 0.5 and 2.0,

the weight ratio of (saturated fatty acid residues having 18 to 24 carbon atoms) / (saturated fatty acid residues having 16 carbon atoms) in the total S content of the triglycerides is less than 0.2,

20

and the triglycerides contain less than 3 % of arachidic and behenic acid residues based on the total fatty acid residue content of the triglycerides,

25

and wherein the saturated fatty acid residue content of the triglycerides is less than 45 % by weight of the total fatty acid residues in the triglycerides.

2. Composition as claimed in Claim 1, which is a blend of fats including (i) an interesterified palm olein with an iodine value of 45 to 70 and (ii) a palm oil fraction with an SUS-content of less than 50 wt% and an SSS-content of at least 20 wt%.

30

3. Composition as claimed in Claim 2, which is a blend of fats including (i) an interesterified palm olein with an iodine value of 50 to 70 and (ii) a palm oil fraction with an SUS-content of less than 40 wt% and an SSS-content of at least 25 wt%.
- 5
4. Composition as claimed in Claim 2, which is a blend of at least three components, further comprising a liquid oil.
5. Composition as claimed in Claim 4, wherein the liquid oil is canola oil.
- 10
6. Composition as claimed in Claim 1, wherein the S₂U content is less than 35 %.
7. Composition as claimed in Claim 1, wherein the S₃ content is greater than 8 %.
- 15
8. Composition as claimed in Claim 1, wherein the weight ratio of (saturated fatty acid residues having 18 to 24 carbon atoms) / (saturated fatty acid residues having 16 carbon atoms) in the total S content of the triglycerides is less than 0.15.
- 20
9. Composition as claimed in Claim 1, wherein the saturated fatty acid residue content of the triglycerides is less than 40 % by weight of the total fatty acid residues in the triglycerides.
- 25
10. Composition as claimed in Claim 1, wherein the triglyceride content of the composition is:
- 8 to 15 % SSS,
11 to 18 % SUS
8 to 16 % SSU
18 to 25 % SU₂ and
at least 35 % U₃.
- 30

11. Composition as claimed in Claim 1 having an N_{10} of 20 to 50.
12. Composition as claimed in Claim 1 having an N_{10} of 30 to 40.
- 5 13. Composition as claimed in Claim 1 having an N_{20} of 10 to 35.
14. Composition as claimed in Claim 1 having an N_{20} of 15 to 30.
15. Composition as claimed in Claim 1 having an N_{30} of less than 18.
- 10 16. Composition as claimed in Claim 1 having an N_{30} of 3 to 15.
17. Composition as claimed in Claim 1 which is essentially free of *trans* fatty acid residues.
- 15 18. A method of producing a baked product which comprises preparing a mixture and baking the mixture, and which comprises the step of incorporating the composition of Claim 1 in the mixture.
- 20 19. A method of produced an iced confectionery product which comprises applying to a baked product an icing comprising the composition of Claim 1.
20. The use of the composition of Claim 1 as an ingredient in baking.
- 25 21. Bakery composition comprising the composition of Claim 1 and one or more other baking ingredients.
22. Icing composition comprising the composition of Claim 1, sugar and water.
- 30 23. Baked product comprising the composition of Claim 1.
24. Iced confectionery product comprising the composition of Claim 1.

25. A method of producing the composition of Claim 1, which comprises blending a mixture of fats including (i) an interesterified palm olein with an iodine value of 45 to 70 and (ii) a palm oil fraction with an SUS-content of less than 50
5 wt% and an SSS-content of at least 20 wt%.

26. Method as claimed in Claim 25, wherein the mixture of fats is a blend of at least three components, further comprising a liquid oil.

10

ABSTRACT
FAT COMPOSITION

5 A vegetable fat composition comprises glycerides, wherein the triglyceride content of the composition is:

6 to 20 % SSS,
5 to less than 20 % SUS
5 to less than 25 % SSU
10 10 to 39 % SU₂ and
at least 20 % U₃,

wherein S is a saturated fatty acid residue having 16 to 24 carbon atoms and U is an unsaturated fatty acid residue having at least 18 carbon atoms and all
15 percentages are by weight based on the total triglycerides present in the composition,

the weight ratio SUS/SSU is between 0.5 and 2.0,

20 the weight ratio of (saturated fatty acid residues having 18 to 24 carbon atoms) / (saturated fatty acid residues having 16 carbon atoms) in the total S content of the triglycerides is less than 0.2,

and the triglycerides contain less than 3 % of arachidic and behenic acid residues
25 based on the total fatty acid residue content of the triglycerides,

and wherein the saturated fatty acid residue content of the triglycerides is less than 45 % by weight of the total fatty acid residues in the triglycerides. The composition may be used to produce baked products and iced confectionery
30 products.



PATENT
ATTORNEY DOCKET NO. 059490-5034-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
	)	
Inventor(s): Anthony George HERZING et al.	)	
	)	
Application No.: 11/451,606	)	Group Art Unit: 1761
	)	
Filed: June 13, 2006	)	Examiner: unassigned
	)	
For: FAT COMPOSITION	)	

SUPPLEMENTAL DISCLOSURE STATEMENT

Commissioner for Patents
U.S. Patent and Trademark Office
Customer Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

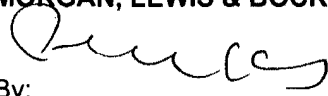
Supplementing the applicants' Information Disclosure Statement filed on June 13, 2006, attached hereto is a supplemental PTO-1449 listing additional documents known to the applicants. Copies of the EP publications and Kallio et al. disclosure are attached.

The Examiner's attention is also called to the commonly assigned, copending U.S. Application No. 10/986,044 and Application No. 10/972,615.

The Examiner is requested to consider the foregoing and the attached , along with the earlier filed disclosure submission, in the examination of this application.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP


By: _____
Paul N. Kokulis
Reg. No. 16,773

Dated: January 11, 2007

Customer No. 09629
MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
(202) 739-3000

1-WA/2221197.1



INFORMATION DISCLOSURE CITATION (Use several sheets if necessary) PTO Form 1449	Attorney Docket No. 059490-5034	Serial No. 11/451,606
	Applicants Anthony George HERZING et al.	
	Filing Date June 13, 2006	Group 1761

U.S. PATENT DOCUMENTS

*Examiner Initial	Document Number	Date	Name	Class	Sub Class	Filing Date
	5,935,627	08/1999	Cain et al.	426	93	

FOREIGN PATENT DOCUMENTS								
	Document Number	Date	Country	Class	Sub Class	Translation		
						YES	NO	
	0 536 824 A1	04/1993	Europe	A23D	9/00	X		
	0 555 917 A1	08/1993	Europe	A23D	9/00	X		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
	Kallio et al., J. Agric. Food Chem., 49:3363-3369 (2001)	

Examiner	Date Considered
Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Best Available Copy

EP0555917

Publication Title:

Non-temper filling fats.

Abstract:

Abstract of EP0555917

Fat compositions, comprising: 35-80 wt% SUS less than 5 wt% S3 7-60 wt% (U2S + U3) less than 40 wt% SSU whereas: weight ratio $\frac{S}{U}$; S= saturated fatty acids C16-C18 S'= saturated fatty acids C10-C24 U= unsaturated fatty acids C16-C22 are excellent cool-melting, non-temper, non-trans filling fats. Data supplied from the esp@cenet database - Worldwide

Courtesy of <http://v3.espacenet.com>

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 555 917 A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 93200313.0

(51) Int. Cl.⁵: **A23D 9/00, A23G 3/00,
A23G 1/00**

(22) Date of filing: 05.02.93

(30) Priority: 12.02.92 EP 9220387

(43) Date of publication of application:
18.08.93 Bulletin 93/33(84) Designated Contracting States:
**AT BE CH DE DK ES FR GB GR IE IT LI NL PT
SE**(71) Applicant: **UNILEVER N.V.**
P.O. Box 760
NL-3000 DK Rotterdam(NL)(84) **GB IE**(71) Applicant: **UNILEVER PLC**
Unilever House Blackfriars P.O. Box 68
London EC4P 4BQ(GB)(84) **BE CH DE DK ES FR GR IT LI NL PT SE AT**(72) Inventor: **Cain, Frederick William**
Dr. Blockerstraat 12
NL-2271 VL The Netherlands(NL)
Inventor: **Duurland, Franciscus**
Kerklaan 12**NL-3632 AL The Netherlands(NL)**
Inventor: **Schmidle, Bettina**
Junohof 54
NL-1829 DB Alkmaar(NL)Inventor: **Ten-Wolde-Hakvoort, Joke**
Brigantijnstraat 10
Zaandam(NL)(74) Representative: **Hartong, Richard Leroy et al**
Unilever N.V. Patent Division P.O. Box 137
NL-3130 AC Vlaardingen (NL)(54) **Non-temper filling fats.**

(57) Fat compositions, comprising:

- 35-80 wt% SUS
- less than 5 wt% S3
- 7-60 wt% (U₂S + U₃)
- less than 40 wt% SSU

whereas: weight ratio

SUS < 6

SSU

S = saturated fatty acids C₁₆-C₁₈S' = saturated fatty acids C₁₀-C₂₄U = unsaturated fatty acids C₁₆-C₂₂

are excellent cool-melting, non-temper, non-trans filling fats.

EP 0 555 917 A1

EP 0 555 917 A1

Non-temper confectionery fats consisting substantially of triglycerides that are capable of crystallization in the β -crystal form and contain an externally added, minimal working amount of a fat component that is itself capable of stabilizing β' -crystals, wherein the fat component capable of stabilizing the β' -crystals comprises at least a vegetable triglyceride of the SSO-type and/or a triglyceride of the S_3 -type (S = saturated fatty acid C_{10} - C_{24} ; O = oleic acid), are the subject of British Patent Application 9121578.0.

Although the use of these fat blends in confectionery products is mentioned in this British Patent Application, application of the fats in filling fats is only disclosed in a very generic sense. Fat blends for filling fats need to be softer than fat blends for other confectioneries.

From US 3,492,130 triglyceride compositions are known that are temperable and that are good compatible with cocoa butter. These compositions contain 70-95 wt% SOS-fats, 5-30 wt% SUU + SSU (1:1)-fats and about 1% SSU/ U_2 S-fats. In EP 78,568 margarine fats are disclosed that comprise 3-9% S_3 ; 32-50% SUS, 5-12% SSU and 20-32% SOO/SLS fats. According to EP 347,006 fats for butter-like spreads are composed of 1-9% S_3 ; 30-50% SOS; 5-12% SSO, while the remainder consists of SOO and SLS-fats. In none of these references an application of the fats as filling fats is mentioned, while also the role of the SUS/SSU ratio for the product properties was not understood.

We have now found a new cool-melting, non-temper, non-trans filling fat comprising a fat blend having the following composition :

- 35-80 wt.%, preferably 51-80 wt.%, and most preferably 55-70 wt% of SUS;
- less than 5 wt.%, preferably less than 3 wt.%, of S_3' ;
- 7-60 wt%, preferably 10-50 wt% of (U_2 S + U_3)
- less than 40 wt.% of SSU;
- the weight ratio

SUS
SSU

being < 6,
wherein

- S = saturated fatty acid having 16-18 C atoms;
- S' = saturated fatty acid having 10-24 C atoms;
- U = unsaturated fatty acid having 16-22 C atoms, in particular $C_{18:1}$.

The preferred fat compositions are derived from palm fat so that the SUS component of the fat is mainly POP. Therefore, our new fats contain at least 35 wt.% of $C_{16:0}$, in particular at least 45 wt.% of $C_{16:0}$, and less than 8 wt.% of $C_{18:0}$, in particular less than 6.5 wt.%.

The SSU component of the fat blend is preferably a PPO fat (P = palmitic; O = oleic). These fats are obtainable by an enzymic process as described in our European Patent Applications EP 209 327 and 91300496. However, also StSTO, as obtainable according to European Patent Application 9130551.6, can be applied (St = Stearic).

The S_3' component of our new compositions might contain one type of fatty acid; however, it is preferred to use S_3' of the type $S_1S_2S_1$, wherein S_1 and S_2 are both saturated fatty acids having C_{10} - C_{24} ; however, the carbon numbers of S_1 and S_2 differ by at least two. An example thereof is PStP, which is obtained by the hardening of a palm mid-fraction. It should be emphasized that the maximum amount of S_3' present in the composition is 5 wt%. If a fat blend, however, contains only minor amounts of S_3' and problems arise upon crystallisation of the fat, it is possible to raise the S_3' content, however, remaining below the maximum amount of 5 wt%.

Very suitable fat blends display N_{20} (not-stab; NMR-pulse) values of at least 20, preferably at least 40%. These values are measured after subjecting the fat to the following T-regime: melt at 80 °C; cooling from 80 °C to 60 °C; keep it 10 min. at 60 °C, 1 hr at 0 °C; 0.5 hr at 20 °C.

Our invention also concerns confectionery products consisting at least partly of a filling fat, wherein the fat component of the filling fat has the composition of our new cool-melting, non-temper, non-trans filling fats.

The fillings can further contain cocoa powder, milk powder, such as full cream milk powder (= FCMP), sugar and emulsifier, e.g. lecithin.

The following Examples will illustrate our invention further.

EXAMPLE 1

Chocolate filling compositions were prepared according to the following recipe :

5

10

- Dark chocolate	18 wt. %
- Fat blend	47 wt. %
- FCMP	10 wt. %
- Sugar	25 wt. %
- Lecithin	0.4 wt. %
Total fat content :	55.5 wt. %

In these compositions, fat blends A, B and C were applied; the composition of these fats is given in Table I.

15

TABLE I

20

25

	Blend A	B**	C
S ₃	2.6	2.2	2.3
SUS	77.7	67.7	70.6
SSU	16.0	13.7	14.3
U ₂ S + U ₃	4.6*	17.9	14.4
SUS/SSU	4.8	4.9	4.9
C _{16:0}	55.3	51.1	52.2
C _{18:0}	6.9	6.1	6.4

* not according to invention.

** N₂₀ (n.s.) = 61

30

The fillings were prepared by mixing of the dark chocolate, the FCMP and the sugar in a Hobart mixer at 50 °C with about 15% of the amount of fat (A, B or C) on product. The mixture was refined in a triple roller mill. The remainder of the fat and the lecithin were mixed with the blend thus obtained in a Hobart mixer at 50 °C. The filling was cooled to 30 °C and poured into aluminium cups.

35

The fillings were placed in cabinets at 20 °C and at 25 °C and stored for 2 months.

After storage for 1 week at 20 °C, the samples were evaluated by a trained taste panel. A scale from 1 to 9 was set up for hardness, meltdown and coolness, the scale being:

40

Hardness	1 = soft	9 = very hard
Meltdown	1 = very slow	9 = very fast
Coolness	1 = not cool	9 = very cool

The results were :

45

50

Sample	A	B	C
Hardness	9.0	4.0	4.5
Meltdown	2.0	6.5	5.5
Coolness	2.0	5.0	5.5

Consequently, sample A was too hard, had a slow meltdown and was not cool.

After storage of the samples for 1 month at 20 °C or 25 °C, no bloom was found.

55

EXAMPLE 2

Another filling was prepared by mixing of cocoa powder, FCMP, sugar and about 20% of the fat on product in a Hobart mixer at 50 °C. The mixture was refined in a triple roller mill and conched for three

EP 0 555 917 A1

hours at 50 °C along with a further 15% of the fat on product. The lecithin and the remaining fat were added and the filling was conched for a further hour. It was cooled to 30 °C and poured into aluminium cups. The fillings were placed in cabinets at 20 °C and at 25 °C and stored for 2 months. Consequently, the following recipe was used :

5

- Cocoa powder 10/12	13 wt. %
- Fat blend	52 wt. %
- FCMP	10 wt. %
- Sugar	25 wt. %
- Lecithin	0.4 wt. %
Total fat	55.8 wt. %

10

The fat blends applied were fats D and C (see Table II).

15

TABLE II

	Blend D	C**
S ₃	1.5	2.3
SUS	61.2	70.6
SSU	6.0	14.3
U ₂ S + U ₃	31.8	14.4
SUS/SSU	10.2*	4.9
C _{16:0}	46.9	51.2
C _{18:0}	5.4	6.4

20

25

* not according to invention

** N₂₀ (n.s.) = 66

30

An evaluation of the samples with fats D and C resulted in a coolness value after 1 week at 20 °C of :
4.0 for sample D

6.3 for sample C

After 1 month' storage at 20 °C and 25 °C, sample D showed bloom, whereas sample C showed no trace of bloom.

35

Claims

1. Cool-melting, non-temper, non-trans filling fat comprising a fat blend having the composition :

40

% SUS = 35-80 wt.%, preferably 51-80 wt.%;

% S₃' = less than 5 wt.%, preferably less than 3 wt.%;

% (U₂S + U₃) = 7-60 wt.%, preferably 10-50 wt.%;

% SSU = less than 40 wt.%;

weight ratio

45

$$\frac{\text{SUS}}{\text{SSU}} < 6.$$

50

S = saturated fatty acid having 16-18 C atoms;

S' = saturated fatty acid having 10-24 C atoms;

U = unsaturated fatty acid having 16-22 C atoms, in particular C_{18:1}.

55

2. Cool-melting, non-temper, non-trans filling fat according to claim 1, wherein the fat blend has an SUS-content of 55-70 wt%.

3. Cool-melting, non-temper, non-trans filling fat according to Claims 1 or 2, wherein the SUS component is derived from a palm fat.

Best Available Copy

EP 0 555 917 A1

4. Cool-melting, non-temper, non-trans filling fat according to Claims 1-3, wherein the fat contains at least 35 wt.% of $C_{16:0}$ and less than 8 wt.% of $C_{18:0}$.
5. Cool-melting, non-temper, non-trans filling fat according to Claim 4, wherein the $C_{16:0}$ content is at least 45 wt.% and the $C_{18:0}$ content is less than 6.5 wt.%.
6. Cool-melting, non-temper, non-trans filling fat according to claims 1-5, wherein the fat blend displays an N_{20} (n.s.) of at least 20, preferably at least 40.
7. Confectionery product consisting at least partly of a filling fat, wherein the fat component of the filling fat has a composition according to Claims 1-6.

Best Available Copy



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 20 0313

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
D,X	EP-A-0 078 568 (THE PROCTER & GAMBLE COMPANY)	1,3,4	A23D9/00
Y	* page 36; claims 1,4,6 *	1,2,7	A23G3/00
A	* page 47, line 12 - line 32 *	5	A23G1/00
D,X	EP-A-0 347 006 (UNILEVER NV) * page 3, line 3-4; claims 5,6 * * page 2, line 40 - line 41; example 2 * * page 3, line 38 - line 40 *	1	
Y	PATENT ABSTRACTS OF JAPAN vol. 004, no. 174 2 December 1980 & JP-A-55 114 261 (FUJI OIL CO LTD) 3 September 1980 * abstract *	1,2,7	
D,Y	US-A-3 492 130 (J.HARWOOD)	1,2,7	
A	* column 1, line 44 - line 72; claims 1-3,5,6; examples 1,2 * * page 5 - page 6; table 1 * * column 2, line 40 - line 71 *	4,5	
A	DATABASE WPI Section Ch, Week 8016, Derwent Publications Ltd., London, GB; Class D, AN 80-28519C & JP-A-55 034 052 (ASAHI DENKA KOGYO) 11 March 1980 * abstract *	1,6,7	TECHNICAL FIELDS SEARCHED (Int. Cl.5) A23D A23G
A	EP-A-0 397 247 (UNILEVER NV) * page 2, line 40 - line 45; claims 1-3,11-14; examples 1,2 *	1-3,6,7	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 MARCH 1993	Examiner KANBIER D.T.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

EPO FORM 1503 (03.92) (P0001)

Best Available Copy

EP0536824

Publication Title:

Non-temper, confectionery fats.

Abstract:

Abstract of EP0536824

fec Fats that consist predominantly of triglycerides, capable of crystallization in the b-crystal form can be stabilized in their b<1>-crystal form by the external addition of an effective amount of SSO and/or S<7>-triglycerides (S= sat. fatty acids C<5><4>-C<6><8>; O= oleic acid). This way tempering of the fats is no longer required. Data supplied from the esp@cenet database - Worldwide

Courtesy of <http://v3.espacenet.com>



(11) Publication number : **0 536 824 A1**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **92202899.8**

(51) Int. Cl.⁵ : **A23D 9/00, A23G 3/00,
A23G 1/00**

(22) Date of filing : **22.09.92**

(30) Priority : **03.10.91 EP 91309075
11.10.91 GB 9121578**

(43) Date of publication of application :
14.04.93 Bulletin 93/15

(84) Designated Contracting States :
**AT BE CH DE DK ES FR GB GR IE IT LI NL PT
SE**

(71) Applicant : **UNILEVER N.V.
P.O. Box 760
NL-3000 DK Rotterdam (NL)**

(84) **BE CH DE DK ES FR GR IT LI NL PT SE AT**

(71) Applicant : **UNILEVER PLC
Unilever House Blackfriars P.O. Box 68
London EC4P 4BQ (GB)**

(84) **GB IE**

(72) Inventor : **Cain, Frederick William
Dr. Blookerstraat 12
NL-2271 VL Voorburg (NL)**
Inventor : **Hughes, Adrian David
Torenstraat 147
NL-2513 BR Den Haag (NL)**
Inventor : **Schmidl, Bettina
Junohof 54
NL-1829 DB Alkmaar (NL)**
Inventor : **Cebula, Deryck Josef
Unilever Research Colworth Lab, Colworth
House
Sharnbrook, Bedford MK44 1LQ (GB)**

(74) Representative : **Hartong, Richard Leroy et al
Unilever N.V. Patent Division P.O. Box 137
NL-3130 AC Vlaardingen (NL)**

(54) **Non-temper, confectionery fats.**

(57) Fats that consist predominantly of triglycerides, capable of crystallization in the β -crystal form can be stabilized in their β^1 -crystal form by the external addition of an effective amount of SSO and/or S₃-triglycerides (S= sat. fatty acids C₁₀-C₂₄; O= oleic acid). This way tempering of the fats is no longer required.

EP 0 536 824 A1

Several types of confectionery fats are known. The most sophisticated cocoa butter like of those are triglyceride compositions that require tempering when used in confectionery products. This tempering is meant to transfer the crystal form of the fat components from unstable (α or β') to stable (β) forms. When tempering and cooling, carried out to solidify the confectionery product is not performed this change in crystal form will proceed in the confectionery product, albeit slowly leading to undesirable phenomena, such as so called blooming of the confectionery product.

Although fats are known that do not need tempering, because the triglycerides easily crystallize directly into their most stable crystal form (usually β'), those fats have other disadvantages. Examples of such fats are triglyceride compositions high in trans fatty acids and triglycerides compositions high in lauric fatty acids. The trans acids however are considered as rather unhealthy, whereas the laurics are easily hydrolyzed, resulting in the development of an undesirable taste. Therefore the confectionery industry has already been looking for a long time for confectionery fats that do not need to be tempered, and that do not display the disadvantages of trans and/or lauric fats.

We have found a solution for the above problem. We have found new fat compositions, that do not need to be tempered and, that do not contain trans acids or lauric fats. Those new fat compositions consist predominantly of triglycerides with more than 50 wt% SOS-type triglycerides that are capable of crystallization in the β crystal form, and contain an externally added, minimal working amount of a fat component, capable itself of stabilizing β' crystals, wherein the fat component capable of stabilizing the β' crystals at least comprises a vegetable triglyceride of the SSO-type and/or a triglyceride of the S_3 -type, also containing an SOO-type triglyceride in such an amount that the weight ratio SSO:SOO is at least 3.0, preferably at least 5.0, while the St:P weight ratio of the total fat composition is less than 1.0, wherein S = saturated fatty acid C_{10} - C_{24} ; O = oleic acid; St = stearic acid; P = palmitic acid and U = unsaturated fatty acid C_{18} - C_{22} . Any combination of saturated fatty acids can be used for SSO, and similarly for S_3 .

The main component of those compositions, capable of crystallization in the β crystal form is preferably a fat high in POP, in particular more than 50 wt% of POP, more preferably more than 70 wt% of POP is present in this fat (P = palmitic acid). Suitable fats are palm mid fractions, as obtainable from dry- or wet fractionation of palm oil. The most preferred fat is obtained from a double wet fractionation of palm oil.

However, also fats, high in StOSt, in particular more than 50 wt% of StOSt can be stabilized in this way. Examples thereof are cocoa butter, shea and illipe and fractions thereof. Of course also mixtures of fats high in POP and high in StOSt can be stabilized.

From US 3,492,130 compositions are known that are temperable to stable triple chain length beta-crystalline forms. These compositions consist of 60-95 wt% of SUS-triglycerides and 40-5 wt% of an equimolecular proportion of triglycerides of the type SUU and SSU (S = sat. C_{16} - C_{18} , U = unsat. C_{16} - C_{18}). It is further stated (column 3, lines 28-40) that temperable compositions cannot be obtained, if SUU or SSU are omitted or when small amounts of S_3 are added. We have aimed for triglyceride-compositions, capable of crystallisation in the β -crystal form, that contain small amounts of SSU and/or S_3 in order to stabilize them in the β' -crystal form. These compositions must have the triglyceride composition according to our invention.

According to EP 23 062 triglycerides compositions are aimed for, which can be used as cocoa butter replacers in amounts up to 100% of the added cocoa butter in chocolate. These compositions should temper under the same conditions as cocoa butter to β -3 crystals. The triglycerides comprise a blend of 75-99 wt% of SUS¹, and less than 13 wt% of a mixture of SUU and SSU which blend displays an St:P weight ratio of 1.2 to 2. The compositions according to our invention are meant to stabilize the β' -crystal form. Herefore, SSU and/or S_3 is added, the St:P weight ratio of this additive being less than 1.0.

Structural margarine fats with the composition:

3-9 % S_3

32-50% SOS

5-12 % SSO and

20-32% SSO/SLS are disclosed in EP 78 568.

Our invention does not concern margarine fats. Therefore, our basic triglycerides must contain more than 50 wt% SOS.

In FR 2 334 747 it is disclosed that the solidification rate of fats, e.g. cocoa butter, can be increased by addition of a small amount of a trisaturated triglyceride (tri-stearin according to the examples). Nothing is disclosed about the stabilisation of β' -crystals in fats capable of crystallisation in β -crystal form.

Although the triglyceride, capable of crystallization in the β crystal form in general will contain some SSO and/or S_3 , the amount of SSO and/or S_3 is insufficient to stabilize the β' crystal form. Therefore it is necessary to add externally an effective (= minimum working) amount of SSO, S_3 , or a mixture thereof. The amount of SSO in the total fat composition, so including the naturally occurring SSO-fat, should be at least 8 and at most 40 wt%, preferably 10-20 wt%. The SSO component is preferably derived from palmitic and/or stearic as satu-

rated fatty acids. Useful fats are PPO, as obtainable according to our enzymic process as described in our European patent applications EP 209 327 and EP 496 456 and StStO, as disclosed in our European patent application 91305516. The addition of S_3 to amounts from 2 up to 20 wt%, preferably 3-15 wt% based on the total fat composition leads also to improved fats.

5 In fact we have found that filling fats are in particular improved by the addition of SSO-fats; coating fats are in particular improved by the addition of S_3 /SSO-combinations. However, this does not mean that incorporation of other fats, within the scope of our invention, does not lead to improvement.

The best results are obtained when in combination with the SSO component also an S_3 fat is added to the composition. However the amount of S_3 that can be added is limited to maximum 20 wt% (preferably less than 15%); using more than 20 wt% of S_3 would lead to unacceptable waxy products. The S_3 -fat might contain one type of fatty acid, however it is preferred to use S_3 of the type $S'S''S'$, wherein S' and S'' are both saturated fatty acid with C_{10} - C_{24} , however the carbon numbers of S' and S'' differ by at least two. An example of such a fat, that can be obtained from the hardening of a palm mid fraction, is PStP. A preferred amount of $S'S''S'$ is 2-10 wt% on total fat (so including any natural occurring S_3 as well).

15 In order to obtain the desired properties of our fat compositions we found that it is advantageous when the POP/SSO - weight ratio of the fat is kept below 6.

Very good fat compositions were obtained, when the amounts of SSO and S_3 that are added to the basic fat are such, that the N-30-values of the total fat composition, when measured after stabilization and when measured without stabilization meet the requirements of:

$$20 \quad \frac{N_{30}(\text{stab})}{N_{30}(\text{unstab})} < 4.0$$

Unstabilized fats were measured after the following regime: melt at 80°C; 5 mins. at 60°C; 1 hr at 0°C; 30 mins at 30°C. Stabilized fats were measured after the following regime: melt at 80°C; 5 mins at 60°C; 90 mins at 0°C; 40 hrs at 26°C; 90 mins at 0°C; 60 mins at 30°C.

25 It is preferred when this ratio is less than 3.0.

The invention also concerns the use of the fat compositions according to the invention as β^1 -stabilized triglyceride compositions.

Also the use of our fat compositions as β^1 -stabilized triglyceride compositions in confectionery filling fat or in confectionery coating fat is part of the invention.

30 Further non-tempered chocolate compositions, and products made thereof, that contain our new fat compositions are part of our invention. In those chocolate compositions the SSU-content of the fat phase should be more than 12 wt%, preferably more than 15 wt%.

For completeness sake it is disclosed that the product PStP and its use for β^1 stabilization are known from EP 369 516. The use of this fat for stabilization of β^1 fat crystals in confectionery fats, i.e. fats with more than 50 wt% of SOS-triglycerides is, however, not disclosed therein. From EP 354.025 it is known that addition of SSU-containing fat compositions (U = unsaturated fatty acid) to hardbutters can improve the bloom behaviour of the hardbutter. However in this last EP-document nothing is disclosed about the addition of the SSU-component to triglycerides that crystallize in the β^1 crystal form. The SSU is added to e.g. cocoa butter, whereupon the blend is tempered, or to a tempering type hardbutter (New SS-7) or Melano-STS (= trans containing fat), which do not crystallize in the β^1 crystal form. Moreover, nothing is disclosed about the use of combinations of SSO and S_3 .

Example I

45 The following fatblends were made:

1. Palm mid fraction (= PMF)
2. PMF + 6 wt% P_3
3. PMF + 6 wt% PStP
4. PMF + 9 wt% PStP
- 50 5. PMF + 6 wt% PStP + 12 wt% PPO

The particulars of the fats, mentioned above are:

PMF : contains 2% S_3 and 70% SOS its FAME being: 55% C_{16} ; 6% $C_{18:0}$ 33% $C_{18:1}$; 4% $C_{18:2}$; 0.5% $C_{20:0}$
So it consists for about 85% of POP.

PStP : contains 20% S_3 other than PStP 80% PStP

55 PPO : contains 6.7% S_3 ; 2% SOS; 77% SSO;
4.5% SSLn; 1% SOO; 8% OSO;
0.5% SOLn

SSO consists for 85% of PPO

FAME: 0.5% C₁₄; 54.8% C₁₆;

7.5% C_{18:0}; 33.7% C_{18:1}; 2% C_{18:2}

P₃ was a palm top fraction, containing more than 90 wt% P₃ (P= palmitic acid).

Those fat blends were used for the preparation of coatings with the following basic composition:

		wt%
10	CP 10/12	: 14
	Fatblends*	: 31
	SMP	: 7
	Sugar	: 48
15	Lecithin	: 0.4
	Total fat content	: 32.5
20	ratio cocoabutter: fatblend	: 5:95

* blends 1-5 were used successively

For evaluation purposes corks were hand enrobed and bars were moulded with the different coating-compositions. The enrobed corks were passed down a cooling tunnel, using a T-regime of 15°C/10°C/15°C; total residence time 5 minutes.

The bars were cooled at 13°C in a static cooling tunnel. N₃₀-values, stabilized and unstabilized were measured of the fatblends 1-5 using the standard NMR-technique.

The results mentioned in tables I (= for the Corks) and II (= for the bars) were obtained.

Example II

The following fat blends were made:

- 35 6. PMF + 12 wt% PPO
7. PMF + 18 wt% PPO + 3 wt% PStP
8. PMF + 12 wt% PPO + 6 wt% PStP
9. PMF + 18 wt% PPO + 3 wt% hard stock
10. PMF + 18 wt% PPO + 3 wt% P₃

40 The same fat components were used as mentioned in Example I.

The hard stock fat, so an S₃ type fat, had the following composition: 20% C₁₂; 8% C₁₄; 24% C₁₆; 44% C_{18:0}; 0.5% C_{18:1} and 0.5% C_{18:2}. Carbon nos.: 4.1% C₃₀-C₃₈; 4.1% C₄₀; 9.8% C₄₂; 12.5% C₄₄; 21.4% C₄₆; 23% C₄₈; 10.6% C₅₀; 9% C₅₂ and 5.3% C₅₄.

45 Those blends were used in the same way for the preparation of coatings and bars with the same basic composition as given in Example I.

The corks were subjected to the same regime as described in example I.

The products were stored at 20°C, 25°C and 30°C and were evaluated. The results are mentioned in tables V-VIII. The bars and corks were also evaluated by subjecting them to a severe T-cycling regime (20 → 32°C every 12 hrs). The results are mentioned in Tables III and IV.

50

55

TABLE I EVALUATION OF CORKS

Fatblend	$N_{30}(S)$ $N_{30}(US)$	condition at tunnel end	Bloom at 20°C days evaluat.	Gloss at 20°C days evaluat.	Criteria:
1.	6.5	not dry	0 5 12 19 35 55	0 5 12 19 35 55	<u>bloom</u> 5=no bloom 4=slight bl. 3=bloom 2=strong bl. 1=intensive bl.
2.	3.2	not dry	0 5 12 19 35 55	0 5 12 19 35 55	<u>gloss</u> 5=very good 4=good 3=average 2=poor 1=very poor
3.	2.1	dry	0 5 12 19 35 55	0 5 12 19 35 55	
4.	1.7	dry	0 5 12 19 35 55	0 5 12 19 35 55	
5.	1.9	dry	0 5 12 19 35 55	0 5 12 19 35 55	

TABLE II EVALUATION OF BARS

Fatblend	$\frac{N_{30}(S)}{N_{30}(US)}$	Bloom at 20°C days evaluat.	Gloss at 20°C days evaluat.
1.	6.5	0 7 12 19 35 55	5 1 1 1 1 1
2.	3.2	0 7 12 19 35 55	5 2 1 1 1 1
3.	2.1	0 7 12 19 35 55	5 5 5 5 5 5
4.	1.7	0 7 12 19 35 55	5 5 5 5 5 5
5.	1.9	0 7 12 19 35 55	5 5 5 5 5 5

TABLE III

Evaluation of bars under severe T-cycling regime		
Fat blend	bloom after days	loss of gloss after days
6	6	2
7	22	6
8	>17	
9	13	1
10	7	4

TABLE IV

Evaluation of corks under severe T-cycling regime		
Fat blend	bloom after days	loss of gloss after days
6	-	-
7	22	2
8	-	-
9	12	3
10	6	3

Table V

BARS

Day	Bloom 20°C					25°C					30°C				
	6	7	9	10		6	7	9	10		6	7	9	10	
0	5	5	5	5		5	5	5	5		5	5	5	5	
1	5	5	5	5		5	5	5	5		5	5	5	5	
2	5	5	5	5		5	5	5	5		5	5	5	5	
3	5	5	5	5		5	5	5	5		5	5	5	5	
4	5	5	5	5		5	5	5	5		5	5	5	5	
5	5	5	5	5		5	5	5	5		5	5	5	5	
6	5	5	5	5		5	5	5	5		5	5	5	5	
7	5	5	5	5		5	5	5	5		5	5	5	5	
8	5	5	5	5		5	5	5	5		5	5	5	5	
9	5	5	5	5		5	5	5	5		5	5	5	5	
13	5	5	5	5		5	5	5	5		5	5	5	5	
20	5	5	5	5		5	5	5	5		5	5	5	5	
1 month	5	5	5	5		5	5	5	5		5	5	5	5	
2 months	5	5	5	5		5	5	5	5		5	5	4	4	
3 months	5	5	5	5		4	5	5	5		1	4/5	4	4	
4 months	5	5	3/4	5		4	5	4	4		1	4	4	4	

Table VI

BARS														
	Gloss 20°C				25°C				30°C					
day	6	7	9	10	6	7	9	10	6	7	9	10		
0	5	5	5	5	5	5	5	5	5	5	5	5	5	5
1	5	5	5	5	5	5	5	5	3	5	5	5	5	5
2	5	5	5	5	5	5	5	5	3	5	5	5	5	5
3	5	5	5	5	4	5	5	5	2	5	4	5	5	5
4	5	5	5	5	4	5	4	5	2	5	3/4	5	5	5
5	5	5	5	5	4	5	4	5	2	5	3/4	5	5	5
6	5	5	5	5	3	5	3/4	5	1	5	3/4	5	5	5
7	5	5	5	5	3	5	3	5	1	5	3	3	3	3
8	5	5	5	5	3	5	3	5	1	5	3	3	3	3
9	5	5	5	5	3	5	3	5	1	5	3	3	3	3
13	5	5	5	5	2	5	3	5	1	5	3	3	3	3
20	5	5	5	5	2	5	3	5	1	5	3	3	3	3
1 month	4	4	5	4	2	4	2	4	1	3	2	2	2	2
2 months	4	4	4	4	1	4	1	4	1	3	1	2	2	2
3 months	3/4	4	3/4	4	1	3	1	3	1	1	1	1	1	1
4 months	3/4	4	3/4	4	1	2	1	2	1	1	1	1	1	1

Table VII

CORKS

Day	Bloom 20°C				25°C				30°C			
	6	7	9	10	6	7	9	10	6	7	9	10
0	5	5	5	5	5	5	5	5	5	5	5	5
1	5	5	5	5	5	5	5	5	5	5	5	5
2	5	5	5	5	5	5	5	5	5	5	5	5
3	5	5	5	5	4/5	5	5	5	4/5	5	5	5
4	5	5	5	5	4/5	5	5	5	4/5	5	5	5
5	5	5	5	5	4/5	5	5	5	4/5	5	5	5
6	5	5	5	5	4/5	5	5	5	4/5	5	5	5
7	5	5	5	5	4	5	5	5	4	5	5	5
8	5	5	5	5	4	5	5	5	4	5	5	5
9	5	5	5	5	4	5	5	5	4	5	5	5
13	5	5	5	5	4	5	5	5	4	5	5	5
20	5	5	5	5	4	5	5	5	4	5	5	5
1 month	5	5	5	5	4	5	5	5	4	5	5	5
2 months	5	5	5	5	4	4	4	5	4	4	4	5
3 months	4	5	4	4/5	3	4	4	4	1	4	1	1
4 months	4	5	3/4	4	3	4	4	4	1	4	1	1

Table VIII

CORKS															
		Gloss 20°C					25°C					30°C			
	day	6	7	9	10		6	7	9	10		6	7	9	10
5	0	4	4	3	4		4	4	3	4		4	4	3	4
	1	3	4	3	4		3	4	3	4		3	3	3	4
	2	3	4	3	4		3	4	3	4		3	3	3	4
10	3	3	4	3	4		1	4	2	4		1/2	3	2	4
	4	3	4	3	4		1	4	2	4		1	3	2	4
	5	3	4	3	4		1	4	2	4		1	3	2	4
15	6	3	4	3	4		1	4	2	4		1	3	2	4
	7	3/4	4	3	4		1	4	2	4		1	3	2	4
	8	2/3	4	3	4		1	4	2	4		1	3	2	4
20	9	2/3	4	3	4		1	4	2	4		1	3	2	4
	13	2	4	3	4		1	4	2	4		1	3	2	4
	20	2	4	3	4		1	3	2	3		1	3	2	3
25	1 month	2	4	2	4		1	2	1	2		1	2	1	2
	2 months	2	3	2	3		1	1	1	1		1	2	1	2
	3 months	1	2	1	2		1	1	1	1		1	1	1	2
30	4 months	1	2	1	2		1	1	1	1		1	1	1	1

Claims

1. Fat composition, consisting predominantly of triglycerides with more than 50 wt% SUS-type triglycerides, that are capable of crystallization in the β crystal form, wherein the composition also contains an externally added, minimal working amount of a fat component, capable of stabilizing β^1 crystals, which comprises at least a vegetable triglyceride of the SSO- type and/or of the S_3 -type, also containing an SOO-type triglyceride in such an amount that the weight ratio SSO:SOO is at least 3.0, preferably at least 5.0, while the St:P weight ratio of the total fat composition is less than 1.0, wherein S= sat fatty acids $C_{10}-C_{24}$; O= oleic acid; St= stearic acid; P= palmitic acid and U= unsaturated fatty acid $C_{18}-C_{22}$, whereas any combination of saturated fatty acids can be present in SSO and S_3 .
2. Fat composition according to claim 1, wherein the triglyceride capable of crystallization in β -crystal form is a fat high in POP, in particular more than 50 wt% POP (P = palmitic).
3. Fat composition according to claim 2, wherein the fat high in POP is a palm mid fraction, in particular double fractionated palm mid fraction.
4. Fat composition according to claim 1, wherein the triglyceride capable of crystallization in β -crystal form is a fat high in StOst (St= stearic), in particular more than 50 wt% StOst, such as shea fractions, Illipe fractions and cocoa butter fractions.
5. Fat composition according to claim 1, wherein the total SSO-fat content of the fat composition is at least

8 wt% and at most 40 wt%, preferably 10-20 wt%.

6. Fat composition according to claim 1, wherein the SSO-fat is PPO or StStO (P = palmitic, St = stearic, O = oleic).
- 5 7. Fat composition according to claim 1, wherein the S_3 content of the total fat composition is 2-20 wt%, preferably 3-15 wt%.
8. Fat composition, according to claims 1 or 7, wherein S_3 is a fat of the type $S'S''S'$, wherein S' = sat. fatty acid $C_{10}-C_{24}$ and S'' = S' plus at least 2-C-atoms.
- 10 9. Fat composition according to claims 1, 7 or 8 wherein S_3 is PStP, that is present in 2-10 wt% on the total fat composition.
11. Fat composition according to claim 1, wherein the SSO-component is present in such an amount that the weight ratio $\frac{POP}{SSO}$ in the total fat is less than 6.
- 15 11. Fat composition according to claims 1-10, wherein the fat components SSO and S_3 are present in amounts, that display to the fat composition N_{30} -values stabilized and unstabilized, so that $\frac{N_{30}(\text{stab})}{N_{30}(\text{unstab})}$ is less than 4.0, preferably less than 3.0.
- 20 12. Use of fat blends with the composition of claims 1-11, wherein the blends are used as β^1 -stabilized triglyceride compositions.
- 25 13. Use of fat blends with the composition of claims 1-11 wherein the blends are used as β^1 stabilized triglyceride compositions in confectionery filling fats.
- 30 14. Use of fat blends with the composition of claims 1-11 wherein the blends are used as β^1 stabilized triglyceride compositions in confectionery coating fats.
15. Non-tempered chocolate compositions, wherein an effective amount of the fat compositions according to claims 1-11 is present.
- 35 16. Non-tempered chocolate compositions according to claim 15, wherein so much of the fat compositions according to claims 1-11 is present that the SSU content of the fat phase is more than 12 wt%, preferably more than 15 wt%.



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 20 2899
Page 1

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
D,A	US-A-3 492 130 (J. HARWOOD) * column 2, line 40 - line 62; claims 1-5,7; examples 1,2,5,7,8 * * column 1, line 37 - column 2, line 6 * * column 3, line 32 - line 35 * * column 4, line 5-8 * ---	1,2,4-6, 10,12,13	A23D9/00 A23G3/00 A23G1/00
D,A	FR-A-2 334 747 (DYNAMIT NOBEL AKTIENGESELLSCHAFT) * page 2, line 13 - line 36; claims 1,4,8; example 8 * * page 4, line 20 - line 22 * * page 3, line 7-8 * * page 6, line 7-10 * ---	7-9, 12-16	
A	EP-A-0 369 516 (THE PROCTER & GAMBLE COMPANY) * page 2, line 14 - line 16; claims 1-3 * * page 3, line 25 - line 27 * ---	1,7-9,12	
A	EP-A-0 034 065 (UNILEVER LIMITED) * page 4, line 33 - page 5, line 1; claims 1,5,8,9,15,16,19; examples 1,2 * * page 2, paragraph 2 * ---	2-5	TECHNICAL FIELDS SEARCHED (Int. Cl.5) A23D A23G
D,A	EP-A-0 023 062 (THE PROCTER & GAMBLE COMPANY) * page 8, line 26 - page 9, line 5; claims 1-3,6,8,9 * * page 9, line 24 - line 33 * * page 6, line 23 - page 7, line 21 * * page 5, line 6-19 * --- -/--	1,5,6, 10,12-14	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 NOVEMBER 1992	Examiner KANBIER D.T.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document			

EPO FORM 1503 (11.81) (P0401)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 20 2899
Page 2

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 078 568 (THE PROCTER & GAMBLE COMPANY) * page 6, line 17 - line 32; claims 1,3 * * page 5, line 1-22 * * page 7, line 12 - line 23 * * page 10, line 9-12 * ---	1-3,5-7,10	
A	EP-A-0 321 227 (FUJI OIL COMPANY LIMITED) * column 1, line 58 - column 2, line 11; claims 1,3,5,8; example 2 * * column 5, line 34 - line 56 * * column 4, line 60 - column 5, line 3 * * column 3, line 14 - line 24 * * column 4, line 13 - line 27 * ---	1,3,4,12-15	
A	EP-A-0 186 244 (UNILEVER NV) * column 2, line 42 - line 65; claims 1,4,7,9,13,14,17; example 1 * * column 1, line 29 - line 42 * * column 1, line 21 - line 22 * -----	1,5	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
Place of search THE HAGUE		Date of completion of the search 12 NOVEMBER 1992	Examiner KANBIER D.T.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1500 (12.01.92) (P0401)

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	DRAWINGS	TOT CLAIMS	IND CLAIMS
11/451,606	06/13/2006	1761	0.00	059490-5034		26	1

CONFIRMATION NO. 9635

09629
MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC20004

FILING RECEIPT

Date Mailed: 12/13/2006

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Tony Herzing, Residence Not Provided;
Gerald Patrick McNeill, Residence Not Provided;
Harold Kazier, Residence Not Provided;

Power of Attorney: None

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 12/13/2006

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is
US11/451,606

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

Title

Fat composition

Preliminary Class

426

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of

Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/451,606	06/13/2006	Tony Herzing	059490-5034

CONFIRMATION NO. 9635

FORMALITIES
 LETTER

09629
 MORGAN LEWIS & BOCKIUS LLP
 1111 PENNSYLVANIA AVENUE NW
 WASHINGTON, DC 20004

Date Mailed: 12/13/2006

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted***Items Required To Avoid Abandonment:**

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 300 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is missing. *A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.*
Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be accompanied by a marked up copy as set forth in 37 CFR 1.125(c) and a statement that the specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
 - Papers must be legibly written either by a typewriter or mechanical printer in permanent ink or its equivalent in portrait orientation on flexible, strong, smooth, non-shiny, durable, and white paper. The text must be written in a nonscript type font (e.g., Arial, Times Roman, or Courier, preferably a font size of 12) lettering style having capital letters that should be at least 0.3175 cm. (0.125 inch) high. A font with capital letters smaller than 0.3175 cm. (0.125 inch) high is only acceptable if the writing is

clear and legible. Application papers must be presented in a form having sufficient clarity and contrast between the paper and the writing thereon to permit the direct reproduction of readily legible copies in any number by use of photographic, electrostatic, photo-offset, and microfilming processes and electronic reproduction by use of digital imaging and optical character recognition. Pages All are not in compliance with 37 CFR 1.52(a) or (b).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of **\$300** as a non-small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.
- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$1430** for a non-small entity

- **\$300** Statutory basic filing fee.
- **\$130** Surcharge.
- The application search fee has not been paid. Applicant must submit **\$500** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit **\$200** to complete the examination fee for a non-small entity.
- Total additional claim fee(s) for this application is **\$300**
 - **\$300** for **6** total claims over 20.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
<https://portal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.



Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199, or 1-800-972-6382
PART 3 - OFFICE COPY



Commissioner for Patents

MAIL STOP PATENT APPLICATION

PATENT
ATTORNEY DOCKET NO.: 059490-5034

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



TRANSMITTAL FOR A NEWLY EXECUTED ORIGINAL APPLICATION
UNDER 37 C.F.R. §1.53(b)

This is a request for filing a patent application under 37 C.F.R. §1.53(b) for:

Inventors: Tony HERZING
Gerald Patrick McNEILL
Harold KAZIER

For: FAT COMPOSITION

1. This is a new ☒ Utility ☐ Design ☐ Plant patent application.

2. The papers enclosed to obtain a filing date are as follows:

17 Pages of Specification including:

0 Title Page

12 Pages of Description

04 Pages of Claims

01 Page of Abstract

 Sheets of drawings containing Figures

☐ The enclosed drawings are photographs, and there is also attached a
PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)

17 TOTAL NUMBER OF APPLICATION SHEETS

3. Combined Declaration and Power of Attorney



Enclosed and is executed by all inventors



Not Enclosed.

This application is being filed under the provisions of 37 C.F.R. §1.53(f).
Applicant(s) await notification from the Patent and Trademark Office of
the time set for filing the Declaration and paying the filing fees.

4. Language

- ☒ English
☐ Non-English

This application is being filed in accordance with 37 C.F.R. §1.52(d) and §608.01 of the MPEP. Applicant(s) await notification from the Patent and Trademark Office of the time set for filing the verified English translation and the processing fee.

5. Assignment

- ☐ An assignment of the invention to _____ and a PTO Form-1595, Recordation Form Cover Sheet, are enclosed.
☒ An assignment will be filed at a later date.

6. Priority - foreign applications under 35 U.S.C. §119(a)-(d) or §365(b) or PCT international applications under 35 U.S.C. §365(a) designating at least one country other than the U.S.

☐ Priority of the following foreign application is claimed:

Country	Application No.	Filed

Certified copy: ☐ is attached. ☐ will follow.

7. Priority based on provisional application(s) - 35 U.S.C. §119(e)

☐ Priority of the following provisional application(s) is claimed:

Application No.	Filed

A. Relate Back - 35 U.S.C. §119(e)

- ☐ Attached is a Preliminary Amendment amending the specification by inserting before the first line the sentence: "This application claims priority of copending provisional application(s) No. _____ filed on _____."

8. Small entity status

- ☐ Applicant(s) hereby assert(s) small entity status under 37 C.F.R. § 1.27.

9. Fee Calculation (37 C.F.R. §1.16)

	Number Filed	Number Extra	at Rate of	Basic Fee Utility \$300.00 Design \$200.00
			BASIC FEE	300.00
Total Claims (37 C.F.R. §1.16(c))	26 - 20 =	6	50.00	300.00
Independent Claims (37 C.F.R. §1.16(b))	1 - 3 =	0	200.00	
Multiple dependent claim(s), if any (37 C.F.R. §1.16(d))			360.00	
Application Size Fee- \$250.00 for each additional 50 sheets that exceeds 100				
Search Fee			\$500.00	500.00
Examination Fee			\$200.00	200.00
SUB-TOTAL =				1,300.00
Reduction by 1/2 for filing by a small entity				
SUB-TOTAL =				1,300.00
Assignment Recordation Fee			\$40.00	
TOTAL FILING FEE =				\$1,300.00

10. Fee Payment

☒ Not Enclosed. **NO FEE IS BEING PAID BY CHECK OR DEPOSIT ACCOUNT AT THIS TIME.**

This application is being filed under the provisions of 37 C.F.R. §1.53(f). Applicant(s) await notification from the Patent and Trademark Office of the time set for filing the Declaration and paying the filing fees.

☐ Please charge Deposit Account No. 50-0310 in the amount of \$ representing the total filing fee as calculated in Section 9 above.

11. ☒ **Except** for issue fees payable under 37 C.F.R. §1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0310. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. §1.136(a)(3).

12. Additional papers enclosed:

- ☐ Preliminary Amendment
- ☒ Information Disclosure Statement
- ☒ Form PTO-1449, 6 documents included
- ☐ Declaration of Biological Deposit
- ☐ Submission of "Sequence Listing", computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

Please accord this application an application number and filing date.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP



Paul N. Kokulis, Reg. No. 16,773

Dated: June 13, 2006

Customer No. 09629

MORGAN, LEWIS & BOCKIUS LLP

(202) 739-3000



Commissioner for Patents

MAIL STOP PATENT APPLICATION

PATENT
ATTORNEY DOCKET NO.: 059490-5034

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



TRANSMITTAL FOR A NEWLY EXECUTED ORIGINAL APPLICATION
UNDER 37 C.F.R. §1.53(b)

This is a request for filing a patent application under 37 C.F.R. §1.53(b) for:

Inventors: Tony HERZING
Gerald Patrick McNEILL
Harold KAZIER

For: FAT COMPOSITION

1. This is a new ☒ Utility ☐ Design ☐ Plant patent application.

2. The papers enclosed to obtain a filing date are as follows:

17 Pages of Specification including:

0 Title Page

12 Pages of Description

04 Pages of Claims

01 Page of Abstract

 Sheets of drawings containing Figures

☐ The enclosed drawings are photographs, and there is also attached a
PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)

17 TOTAL NUMBER OF APPLICATION SHEETS

3. Combined Declaration and Power of Attorney

☐ Enclosed and is executed by all inventors

☒ Not Enclosed.

This application is being filed under the provisions of 37 C.F.R. §1.53(f).
Applicant(s) await notification from the Patent and Trademark Office of
the time set for filing the Declaration and paying the filing fees.

4. Language

- ☒ English
☐ Non-English

This application is being filed in accordance with 37 C.F.R. §1.52(d) and §608.01 of the MPEP. Applicant(s) await notification from the Patent and Trademark Office of the time set for filing the verified English translation and the processing fee.

5. Assignment

- ☐ An assignment of the invention to _____ and a PTO Form-1595, Recordation Form Cover Sheet, are enclosed.
☒ An assignment will be filed at a later date.

6. Priority - foreign applications under 35 U.S.C. §119(a)-(d) or §365(b) or PCT international applications under 35 U.S.C. §365(a) designating at least one country other than the U.S.

☐ Priority of the following foreign application is claimed:

Country	Application No.	Filed

Certified copy: ☐ is attached. ☐ will follow.

7. Priority based on provisional application(s) - 35 U.S.C. §119(e)

☐ Priority of the following provisional application(s) is claimed:

Application No.	Filed

A. Relate Back - 35 U.S.C. §119(e)

- ☐ Attached is a Preliminary Amendment amending the specification by inserting before the first line the sentence: "This application claims priority of copending provisional application(s) No. _____ filed on _____."

8. Small entity status

- ☐ Applicant(s) hereby assert(s) small entity status under 37 C.F.R. § 1.27.

9. Fee Calculation (37 C.F.R. §1.16)

	Number Filed	Number Extra	at Rate of	Basic Fee Utility \$300.00 Design \$200.00
			BASIC FEE	300.00
Total Claims (37 C.F.R. §1.16(c))	26 - 20 =	6	50.00	300.00
Independent Claims (37 C.F.R. §1.16(b))	1 - 3 =	0	200.00	
Multiple dependent claim(s), if any (37 C.F.R. §1.16(d))			360.00	
Application Size Fee- \$250.00 for each additional 50 sheets that exceeds 100				
Search Fee			\$500.00	500.00
Examination Fee			\$200.00	200.00
SUB-TOTAL =				1,300.00
Reduction by 1/2 for filing by a small entity				
SUB-TOTAL =				1,300.00
Assignment Recordation Fee			\$40.00	
TOTAL FILING FEE =				\$1,300.00

10. Fee Payment

☒ Not Enclosed. **NO FEE IS BEING PAID BY CHECK OR DEPOSIT ACCOUNT AT THIS TIME.**

This application is being filed under the provisions of 37 C.F.R. §1.53(f). Applicant(s) await notification from the Patent and Trademark Office of the time set for filing the Declaration and paying the filing fees.

☐ Please charge Deposit Account No. 50-0310 in the amount of \$ representing the total filing fee as calculated in Section 9 above.

11. ☒ **Except** for issue fees payable under 37 C.F.R. §1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0310. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. §1.136(a)(3).

12. Additional papers enclosed:

- ☐ Preliminary Amendment
- ☒ Information Disclosure Statement
- ☒ Form PTO-1449, 6 documents included
- ☐ Declaration of Biological Deposit
- ☐ Submission of "Sequence Listing", computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

Please accord this application an application number and filing date.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP



Paul N. Kokulis, Reg. No. 16,773

Dated: June 13, 2006

Customer No. 09629

MORGAN, LEWIS & BOCKIUS LLP

(202) 739-3000

FAT COMPOSITION

This invention relates to a fat composition. In particular, the invention relates to a vegetable fat composition comprising glycerides and to its applications in baked products and iced confectionery products.

Many food products contain fats. Due to perceived health benefits, there is a desire amongst consumers for food products that have a low content of trans fatty acids and a low content of saturated fatty acids (SAFA). In order to achieve these aims, it is necessary to modify the triglyceride composition of the fats. However, this is a complex problem since most fats rely on the fatty acids of the component triglycerides, for example the saturated fatty acids, in order to achieve the correct balance of organoleptic properties. Simply lowering the SAFA content of the fat will not necessarily lead to a product that is acceptable to the consumer.

15

Triglyceride fats are often characterized in terms of their fatty acid content. The term fatty acid generally refers to straight chain carboxylic acids having from 12 to 24 carbon atoms and is used herein to refer to the carboxylic acid residues bound to the glycerol moiety in the triglyceride, and not to free carboxylic acid.

20

Typically, the abbreviation S is used to denote a saturated fatty acid residue having 16 to 24 carbon atoms and U denotes an unsaturated fatty acid residue having at least 18 carbon atoms. Thus, for example, a pure triglyceride containing three saturated fatty acid residues is denoted SSS (or S_3) and a triglyceride having saturated fatty acids at the 1 and 3 positions and an unsaturated fatty acid at the 2-position is denoted SUS. S_2U refers to combined SSU and SUS, and SU_2 refers to combined SUU and USU.

25

Examples of fat compositions for use in food products are disclosed in the following documents.

30

US 5939114 describes ice cream coating compositions containing triglyceride fats. The fats have a low level of UUU triglycerides of less than 10 % by weight.

EP-A-0815738 discloses non-trans, non-temper filling fats. In the examples, the fats have a SSS content of less than 6 % by weight and a SUS content of greater than 20 % by weight.

- 5 WO 95/07619 relates to healthy fat spreads. The fats contain relatively high levels of C₁₈ to C₂₄ fatty acid residues.

EP-A-0731645 describes healthy fat-containing blends having an SU₂ content of at least 40 % by weight.

10

EP-A-0728415 discloses heat-set, flour-based products containing a fat. The fat has an SUS content of 35-80 % by weight.

- 15 US 5288513 relates to non-temper filling fats comprising a fat blend. The fat has a SSS content of less than 5 % by weight.

EP-A-0783250 describes flexible ice cream coating compositions comprising a sugar and a fat. The fat has an SUS content of 25 to 80 % by weight.

- 20 US 5271950 discloses chocolate compositions. In the examples, the compositions have a relatively high level of C₁₈ to C₂₄ fatty acid residues.

- 25 WO 96/31240 relates to a method of increasing the HDL concentration and the HDL/LDL concentration ratio in human serum by providing a balance between a sufficient and required proportion of cholesterol-free saturated fatty acids in the daily diet.

US 20050142275 describes non-lauric, non-trans, non-temper fat compositions that have relatively high levels of arachidic and behenic acids.

30

Our copending applications, US Serial Nos 10/986,044 and 10/972,615 relate to frying fats and oils and to coating compositions for bakery products, respectively.

There remains a need for good quality bakery fats with low trans content and low saturated fatty acid (SAFA) content.

According to the invention in a first aspect, there is provided a vegetable fat
5 composition comprising glycerides, wherein the triglyceride content of the composition is:

- 6 to 20 % SSS,
- 5 to less than 20 % SUS
- 10 5 to less than 25 % SSU
- 10 to 39 % SU_2 and
- at least 20 % U_3 ,

wherein S is a saturated fatty acid residue having 16 to 24 carbon atoms and U is
15 an unsaturated fatty acid residue having at least 18 carbon atoms and all percentages are by weight based on the total triglycerides present in the composition,

the weight ratio SUS/SSU is between 0.5 and 2.0,
20

~~the weight ratio of (saturated fatty acid residues having 18 to 24 carbon atoms) /~~
~~(saturated fatty acid residues having 16 carbon atoms) in the total S content of the~~
triglycerides is less than 0.2,

25 and the triglycerides contain less than 3 % of arachidic and behenic acid residues based on the total fatty acid residue content of the triglycerides,

and wherein the saturated fatty acid residue content of the triglycerides is less than
45 % by weight of the total fatty acid residues in the triglycerides.

30 It will be understood that S and U may be single fatty acids residues or, more typically, mixtures of different fatty acid residues.

In a second aspect, the invention provides a method of producing a baked product which comprises preparing a mixture and baking the mixture, and which comprises the step of incorporating the composition of the invention in the mixture.

5

A third aspect of the invention is a method of producing an iced confectionery product which comprises applying to a baked product an icing comprising the composition of the invention.

10 A further, fourth aspect of the invention is the use of the composition of the invention as an ingredient in baking.

A fifth aspect of the invention is a bakery composition comprising the composition of the invention and one or more other baking ingredients.

15

The invention also provides, in a sixth aspect, an icing composition comprising the composition of the invention, sugar and water.

A seventh aspect of the invention is a baked product comprising the composition
20 of the invention.

~~In a further, eighth aspect, the invention provides a method of producing the~~
composition of the invention, which comprises blending a mixture of fats
including (i) an interesterified palm olein with an iodine value of 45 to 70 and (ii)
25 a palm oil fraction with an SUS-content of less than 50 wt% and an SSS-content
of at least 20%.

The present invention is based on the finding of a fat composition which has
particularly beneficial properties when used in bakery applications and in
30 confectionery icing. The composition has a low SAFA and a low trans fatty acid
content and yet can have desirable organoleptic properties, including structure and
appearance of the finished product and mouth feel. The composition can also be
produced economically on a commercial scale.

The composition of the invention may be produced as a blend of fats including (i) an interesterified palm olein with an iodine value of 45 to 70 and (ii) a palm oil fraction with an SUS-content of less than 50 wt% and an SSS-content of at least
5 20 wt%. For example, the blend of fats may include (i) an interesterified palm olein with an iodine value of 50 to 70 and (ii) a palm oil fraction with an SUS-content of less than 40 wt% and an SSS-content of at least 25 wt%. More preferably, the blend is a blend of at least three components, further comprising a liquid oil. Suitable liquid oils include canola oil.

10

The composition of the invention preferably has a S_2U content of less than 35 % by weight, more preferably less than 30 % by weight, such as from 24 to 28 % by weight. Typically, SUS content is from 10 to 18 % by weight (such as from 12 to 16 % by weight). The content of SSU is typically 8 to 16 % by weight (such as
15 from 10 to 14 % by weight).

The S_3 content of the composition of the invention is preferably greater than 8 %, such as from 8 to 12 % by weight.

20 The SU_2 content of the composition is preferably from 15 to 30 % by weight, more preferably from 20 to 24 % by weight. The USU content is typically from 2 to 6 % by weight. The SUU content is typically from 10 to 25 % by weight, such as from 16 to 20 % by weight.

25 The U_3 content of the composition is preferably from 30 to 50 % by weight, such as from 35 to 45 % by weight.

The weight ratio of S_2Ln to S_2O in the compositions of the invention (where Ln is linoleic acid (C18:2) and O is U other than Ln) is preferably less than 0.40, more
30 preferably less than 0.30.

The weight ratio of (saturated fatty acid residues having 18 to 24 carbon atoms) / (saturated fatty acid residues having 16 carbon atoms) in the total S content of the triglycerides in the compositions of the invention is preferably less than 0.15.

- 5 Fatty acids (and their residues) are sometimes expressed in the form $C_x:y$, where x is the number of carbon atoms in the fatty acid (or residue) and y is the number of carbon-carbon double bonds.

The preferred C16:0 fatty acid content of the composition is from 20 to 40 % by weight, preferably from 25 to 35 % by weight. Preferably, the composition has a C18:1 content of from 30 to 60 % by weight, such as from 40 to 50 % by weight. The C18:2 content is preferably from 6 to 20 % by weight, such as from 10 to 16 % by weight. The preferred C18:0 content of the composition is less than 5 % by weight, such as from 2 to 4 % by weight. All percentages of fatty acids are based on the weight of the total fatty acid residues in the triglycerides.

The triglycerides of the composition of the invention contain less than 3 % of arachidic and behenic acid residues based on the total fatty acid residue content of the triglycerides. Preferably, they contain less than 2 % or less than 1 % by weight of arachidic and behenic acid residues.

~~The saturated fatty acid residue (SAFA) content of the triglycerides in the~~
composition of the invention is preferably less than 40 % by weight of the total fatty acid residues in the triglycerides. The preferred total content of polyunsaturated C18:2 and C18:3 fatty acid residues is preferably less than 25 % by weight, more preferably less than 20 % by weight, such as 10 to 20 % by weight of the total fatty acid residues in the triglycerides. The preferred total content of monounsaturated C18:1 and C20:1 fatty acid residues is preferably from 35 to 60 % by weight, more preferably from 40 to 50 % by weight, based on the total fatty acid residues in the triglycerides.

In a preferred embodiment of the invention, the triglyceride content of the composition is:

- 8 to 15 % SSS,
11 to 18 % SUS
8 to 16 % SSU
5 18 to 25 % SU₂ and
at least 35 % U₃.

wherein all percentages are by weight based on total triglycerides.

- 10 The composition of the invention preferably has an N₁₀ of 20 to 50, more preferably from 30 to 40. Additionally or alternatively, the composition preferably has an N₂₀ of 10 to 35, more preferably from 15 to 30. Additionally or alternatively, the composition preferably has an N₃₀ of less than 18, more preferably from 3 to 15. These N values are based on unstabilised fats. Thus, the
15 term N_x refers to solid fat content, measured by NMR pulse techniques on unstabilized fats. Unstabilized meaning that the fat was melted at 80 °C, kept at 60 °C for 5 minutes, cooled to 0 °C, kept at 0 °C for 1 hour and kept at measurement temperature for 30 minutes.
- 20 Preferably, the composition of the invention is essentially free of *trans* fatty acid residues. For example, the composition may contain *trans* fatty acid residues in the triglycerides in an amount of less than 1 % by weight; more preferably less than 0.5 % by weight, such as less than 0.1 % by weight. Typically, the only *trans* fatty acid residues present in the compositions will be the low levels that occur in
25 the natural products from which the composition is preferably derived.

The compositions of the invention are vegetable fats. By this, we mean that the fat compositions are principally or wholly derived from fats from vegetable sources, either directly or indirectly, rather than being derived from animals.

- 30 Typically, the compositions of the invention will comprise at least 50 % by weight of fats derived from vegetable sources, more preferably at least 60 % by weight, such as at least 70 %, at least 80 %, at least 90 %, at least 95 % or even 100 % by weight.

The compositions of the invention may be produced by blending commercially available fats. For example, the compositions may be produced by a method which comprises blending a mixture of fats including (i) an interesterified palm olein with an iodine value of 45 to 70 and (ii) a palm oil fraction with an SUS-
5 content of less than 50 wt% and an SSS-content of at least 20 wt%. An example of (i) is interesterified palm oleine having an iodine value of 55. An example of (ii) is palm stearine having an iodine value of 35. Preferably the mixture of fats is a blend of at least three components, further comprising a liquid oil, such as
10 canola oil. The amounts of the components of the blend are selected so as to achieve the desired triglyceride composition. When a three component blend of (i), (ii) and liquid oil is used, the weight amounts are typically 20 to 50 % (more preferably 30 to 40 %) liquid oil, 30 to 50 % (more preferably 38 to 48 %) of (i) and 10 to 30 % (more preferably 15 to 25 %) of (ii). General methods of blending
15 fats, and apparatus for this purpose, are well known in the art.

Compositions of the invention may be used as shortening in bakery products or as components of icing compositions for confectionery. Compositions of the invention may impart one or more beneficial properties to the finished product
20 including mouthfeel, appearance, structure (including, for baked products, crumb firmness) and/or aeration.

For shortening, the compositions may be used alone or in combination with one or more conventional fats. Preferably, the compositions are used alone. Bakery
25 products are typically baked in an oven and include cakes, cookies, biscuits, buns and bread.

Bakery compositions of the invention comprise the composition of the invention and one or more other baking ingredients, such as flour or baking colourants or
30 preservatives.

Icing compositions of the invention comprise the composition of the invention, sugar (e.g., sucrose) and water. The compositions are typically used to apply a

partial or complete coating of icing to confectionery products such as cakes, buns, cookies or biscuits. The icing compositions optionally comprise one or more flavouring agents and/or one or more colourants and may comprise one or more other fats.

5

All publications, patents and patent applications are incorporated herein by reference. While in the foregoing specification this invention has been described in relation to certain preferred embodiments thereof, and many details have been set forth for purposes of illustration, it will be apparent to those skilled in the art that the invention is susceptible to additional embodiments and that certain of the details described herein may be varied considerably without departing from the basic principles of the invention.

The following non-limiting examples illustrate the invention and do not limit its scope in any way. In the examples and throughout this specification, all percentages, parts and ratios are by weight unless indicated otherwise. Fatty acid (residue) contents are expressed by weight based on the weight of the total fatty acid residues in the triglycerides, calculated as free (i.e., hydrolysed) fatty acids. Triglyceride contents are expressed by weight based on the weight of total triglycerides present in the composition.

Examples

Example 1

25 Preparation of reduced saturate shortening

A reduced saturate fat blend according to the invention was prepared by blending together three components: (1) commercially available refined, bleached and deodorized canola oil purchased locally; (2) commercially available refined, bleached deodorized palm stearine with an iodine value of 35, obtained from
30 Loders Croklaan USA (Channahon, IL); and (3) commercially available fully interesterified palm olein with an iodine value of 55 (refined, bleached and deodorized), obtained from Loders Croklaan USA.

The components were melted and blended together in a tank to a final weight of 91 kg (200 pounds) according to the formula below:

5	Canola Oil	33 kg (72 lbs)
	Palm Stearine (IV35)	19 kg (42 lbs)
	Interesterified Palm Oleine (IV55)	39 kg (86 lbs)

The blend was stirred to fully mix the components and passed through three cooling tubes with agitation to crystallize the blend into a smooth, semi-solid mass suitable for use as a bakery shortening. This product was then evaluated for functionality in baked goods.

Analysis

15

The product of Example 1 has the following calculated triglyceride composition:

	Weight %
SSS	10
SUS	14
SSU	12
USU	4
SUU	18
UUU	42

In more detail, the composition is as follows:

20

	Weight %
SSS	10
SOS	11
SSO	9
SLnS	3
SSLn	3
OSO	4
SOO	11

SOLn	7
OOO	19
3+	23

The following is the calculated fatty acid content of the product:

	Weight %
C14:0	1
C16:0	31
C18:0	3
C18:1	46
C18:2	13
C18:3	4
C20:1	1
Others	1

5

The calculated N Values (unstabilised) of the product are:

	%
N10	37.08
N20	23.89
N25	18.41
N30	13.69
N35	9.62
N40	6.72

Example 2

10 Evaluation of reduced saturate bakery shortening prepared in Example 1

A cookie was prepared with the shortening from Example 1. This was almost indistinguishable in texture and mouthfeel from cookies made with a high saturate shortening (50 % saturates). The advantage over a simple blend of canola oil and
 15 palm stearine (IV35) with 35% saturates, was the ability of the shortening to cream with the sugar and maintain aeration. Finished cookies prepared with

simple blends lacked desired structure, exhibited excess spread, crumb firmness (lack of tenderness) and had greasy/oily mouthfeel.

Example 3

5 Use of blend of Example 1 in cake icing

Cake icing was prepared by blending the reduced saturated shortening from Example 1 with confectionery sugar, shortening and water, followed by aeration in a Hobart mixer. The icing was comparable to a high saturate shortening (50 %
10 saturates) with respect to texture and degree of aeration (as measured by specific gravity) immediately after manufacture and during subsequent storage.

For comparison, another formula with reduced saturates (also approximately 35 % saturates) was made from a simple blend of canola oil and palm stearine (IV35)
15 that was solidified according to Example 1. Icings prepared with this blend aerated well initially, but quickly lost structure and aeration during storage. As a result, this icing had an undesirable shiny/oily appearance and a gritty mouthfeel.

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.

CLAIMS

1. A vegetable fat composition comprising glycerides, wherein the triglyceride content of the composition is:

5

6 to 20 % SSS,

5 to less than 20 % SUS

5 to less than 25 % SSU

10 to 39 % SU₂ and10 at least 20 % U₃,

wherein S is a saturated fatty acid residue having 16 to 24 carbon atoms and U is an unsaturated fatty acid residue having at least 18 carbon atoms and all percentages are by weight based on the total triglycerides present in the composition,

15

the weight ratio SUS/SSU is between 0.5 and 2.0,

the weight ratio of (saturated fatty acid residues having 18 to 24 carbon atoms) / (saturated fatty acid residues having 16 carbon atoms) in the total S content of the triglycerides is less than 0.2,

20

and the triglycerides contain less than 3 % of arachidic and behenic acid residues based on the total fatty acid residue content of the triglycerides,

25

and wherein the saturated fatty acid residue content of the triglycerides is less than 45 % by weight of the total fatty acid residues in the triglycerides.

2. Composition as claimed in Claim 1, which is a blend of fats including (i) an interesterified palm olein with an iodine value of 45 to 70 and (ii) a palm oil fraction with an SUS-content of less than 50 wt% and an SSS-content of at least 20 wt%.

30

3. Composition as claimed in Claim 2, which is a blend of fats including (i) an interesterified palm olein with an iodine value of 50 to 70 and (ii) a palm oil fraction with an SUS-content of less than 40 wt% and an SSS-content of at least 25 wt%.

5

4. Composition as claimed in Claim 2, which is a blend of at least three components, further comprising a liquid oil.

5. Composition as claimed in Claim 4, wherein the liquid oil is canola oil.

10

6. Composition as claimed in Claim 1, wherein the S₂U content is less than 35 %.

15

7. Composition as claimed in Claim 1, wherein the S₃ content is greater than 8 %.

20

8. Composition as claimed in Claim 1, wherein the weight ratio of (saturated fatty acid residues having 18 to 24 carbon atoms) / (saturated fatty acid residues having 16 carbon atoms) in the total S content of the triglycerides is less than 0.15.

~~9. Composition as claimed in Claim 1, wherein the saturated fatty acid residue content of the triglycerides is less than 40 % by weight of the total fatty acid residues in the triglycerides.~~

25 10. Composition as claimed in Claim 1, wherein the triglyceride content of the composition is:

8 to 15 % SSS,

11 to 18 % SUS

30 8 to 16 % SSU

18 to 25 % SU₂ and

at least 35 % U₃.

11. Composition as claimed in Claim 1 having an N_{10} of 20 to 50.
12. Composition as claimed in Claim 1 having an N_{10} of 30 to 40.
- 5 13. Composition as claimed in Claim 1 having an N_{20} of 10 to 35.
14. Composition as claimed in Claim 1 having an N_{20} of 15 to 30.
15. Composition as claimed in Claim 1 having an N_{30} of less than 18.
- 10 16. Composition as claimed in Claim 1 having an N_{30} of 3 to 15.
17. Composition as claimed in Claim 1 which is essentially free of *trans* fatty acid residues.
- 15 18. A method of producing a baked product which comprises preparing a mixture and baking the mixture, and which comprises the step of incorporating the composition of Claim 1 in the mixture.
- 20 19. A method of produced an iced confectionery product which comprises applying to a baked product an icing comprising the composition of Claim 1.
-
20. The use of the composition of Claim 1 as an ingredient in baking.
- 25 21. Bakery composition comprising the composition of Claim 1 and one or more other baking ingredients.
22. Icing composition comprising the composition of Claim 1, sugar and water.
- 30 23. Baked product comprising the composition of Claim 1.
24. Iced confectionery product comprising the composition of Claim 1.

25. A method of producing the composition of Claim 1, which comprises
blending a mixture of fats including (i) an interesterified palm olein with an iodine
value of 45 to 70 and (ii) a palm oil fraction with an SUS-content of less than 50
5 wt% and an SSS-content of at least 20 wt%.

26. Method as claimed in Claim 25, wherein the mixture of fats is a blend of at
least three components, further comprising a liquid oil.

10

ABSTRACT**FAT COMPOSITION**

A vegetable fat composition comprises glycerides, wherein the triglyceride

5 content of the composition is:

6 to 20 % SSS,

5 to less than 20 % SUS

5 to less than 25 % SSU

10 10 to 39 % SU_2 and

at least 20 % U_3 ,

wherein S is a saturated fatty acid residue having 16 to 24 carbon atoms and U is

an unsaturated fatty acid residue having at least 18 carbon atoms and all

15 percentages are by weight based on the total triglycerides present in the composition,

the weight ratio SUS/SSU is between 0.5 and 2.0,

20 the weight ratio of (saturated fatty acid residues having 18 to 24 carbon atoms) /

(saturated fatty acid residues having 16 carbon atoms) in the total S content of the
triglycerides is less than 0.2,

and the triglycerides contain less than 3 % of arachidic and behenic acid residues

25 based on the total fatty acid residue content of the triglycerides,

and wherein the saturated fatty acid residue content of the triglycerides is less than

45 % by weight of the total fatty acid residues in the triglycerides. The composition may be used to produce baked products and iced confectionery

30 products.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	
Tony HERZING, et al.	)	
	)	
Application No.: Unassigned	)	Group Art Unit: Unassigned
	)	
Filed: June 13, 2006	)	Examiner: Unassigned
	)	
For: FAT COMPOSITION	)	

Commissioner for Patents
MAIL STOP PATENT APPLICATION

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97(b)

Pursuant to 37 C.F.R. §§ 1.56 and 1.97(b), Applicant brings to the attention of the Examiner the documents listed on the attached PTO-1449.

A copy of each listed document is attached. U.S. references will be provided by request. Applicants respectfully request that the Examiner consider the listed documents and evidence that consideration by making appropriate notation on the attached form.

This submission does not represent that a search has been made or that no better art exists and does not constitute an admission that the listed documents are material or constitute "prior art." If it should be determined that the listed documents do not constitute "prior art" under United States law, Applicants reserve the right to present to the Office the relevant facts and law regarding the appropriate status of such documents. Applicants further reserve the right to take appropriate action to establish the patentability of the disclosed invention over the listed documents, should the documents be applied against the claims of the present application.

If there is any fee due in connection with the filing of this Statement, please charge the fee to our Deposit Account No. 50-0310.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP



Paul N. Kokulis, Reg. No. 16,773

Date: June 13, 2006

MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
(202) 739-3000

INFORMATION DISCLOSURE CITATION (Use several sheets if necessary) PTO Form 1449	Attorney Docket No. 059490-5034	Serial No. Unassigned
	Applicants Tony HERZING, et al.	
	Filing Date June 13, 2006	Group Unassigned

U.S. PATENT DOCUMENTS

*Examiner Initial	Document Number	Date	Name	Class	Sub Class	Filing Date
	5,939,114	Aug. 17, 1999	Cain, et al.			
	5,288,513	Feb. 22, 1994	Cain, et al.			
	5,271,590	Dec. 21, 1993	Yamaguchi, et al.			
	2005/0142275 A1	June 30, 2005	Bach, et al.			

FOREIGN PATENT DOCUMENTS								
	Document Number	Date	Country	Class	Sub Class	Translation		
	EP 0 815 738 A1	Jan. 7, 1998	Europe			YES	NO	
	WO 95/07619	March 23, 1995	WIPO					
	EP 0 731 645	Sept. 18, 1996	Europe					
	EP 0 728 415 A1	Aug. 28, 1996	Europe					
	EP 0 783 250 A	July 16, 1997	Europe					
	WO 96/31240	Oct. 10, 1996	WIPO					

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		

Examiner	Date Considered
Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.01.1998 Bulletin 1998/02

(51) Int. Cl.⁶: **A23D 9/00**, **A23D 7/00**,
A23G 3/00, **A23G 1/00**

(21) Application number: **97201579.6**

(22) Date of filing: **29.05.1997**

(84) Designated Contracting States:
BE DE DK FR GB IT NL SE

(30) Priority: **26.06.1996 EP 96201772**

(71) Applicants:
• **LODERS CROKLAAN B.V.**
NL-1521 AX Wormerveer (NL)
Designated Contracting States:
BE DE DK FR GB IT NL SE
• **UNILEVER PLC**
London EC4P 4BQ (GB)
Designated Contracting States:
GB
• **UNILEVER N.V.**
3000 DK Rotterdam (NL)
Designated Contracting States:
BE DE DK FR IT NL SE

(72) Inventors:
• **Cain, Frederick William**
1521 AZ Wormerveer (NL)
• **Manson née van der Struik, Helga Gerda A.**
1521 AZ Wormerveer (NL)
• **Zwikstra, Nico**
1521 AZ Wormerveer (NL)

(74) Representative:
Sikken, Antonius H. J. M. et al
UNILEVER N.V.,
Patent Division,
P.O. Box 137
3130 AC Vlaardingen (NL)

(54) **Non-trans, non-temper filling fats**

(57) A novel fat-blend for low trans filling fat compositions or for wrapper margarine that upon use do not display posthardening comprise: SUS, SSU and SU₂-triglyceriden, wherein:

- i) the transcontent < 5%
- ii) SUS/SSU-wt ratio < 2
- iii) SUS < 34 wt%
- iv) SU₂ < 55 wt %

S= saturated fatty acid 16-18 C-atoms
U= mono/diunsaturated fatty acid with 18 C-atoms.

Description

Cool-melting, non-trans, non-temper filling fats are known from our EP 555,917. According to this European patent these compositions are obtained if blends are used, comprising 51-80 wt% of SUS-triglycerides; <5 wt% of S3-triglycerides; 7-60 wt% of (U3+U2S)-triglycerides; <40 wt% of SSU-triglycerides, while the weight ratio SUS:SSU triglycerides is <6. Although above fat compositions are excellent non-temper fat compositions we found that above compositions still displayed one disadvantageous effect, i.e. the fats posthardened to much when applied in creams on storage at about ambient temperatures. This posthardening makes the fats less appreciated by the consumer and thus also the products wherein creams made from the fats are present were less appreciated. It is further known from the prior art that this posthardening problem can be overcome by using medium hardened fat compositions, such as a medium hardened mixture of arachidic and soybean oil. However this means that less healthy fats have to be applied, because medium hardening results in the occurrence of substantial amounts of the less healthy trans fats in the hardened fats.

We studied whether we could find a solution for above problem, however under maintaining the advantageous properties of the known fats mentioned in our earlier European Patent 555,917.

This study resulted in novel fat compositions with which the above aims could be fulfilled.

These novel fats comprise fat blends for low trans filling fat compositions or for wrapper margarine comprising

triglycerides of the types SUS, SSU and SU2, wherein the fat blend has a trans fatty acid content <5 wt%, preferably <2 wt% and comprises the the above aims could be fulfilled.

These novel fats comprise fat blends for low trans filling fat compositions or for wrapper margarine comprising

triglycerides of the types SUS, SSU and SU2, wherein the fat blend has a trans fatty acid content <5 wt%, preferably <2 wt% and comprises the triglycerides SUS and SSU in a weight ratio SUS:SSU<2, preferably 0.5-1.5, while SUS is present in an amount <34 weight %, preferably 15-25 wt% and SU2 is present in an amount <55 wt%, preferably 30-50 wt%, which fat blend preferably displays a solid fat index, measured by NMR-pulse on unstabilised fat at 20 °C of 10-35, more preferably 15-30, most preferably 20-25, wherein

S=saturated fatty acid residue with 16-18 C-atoms and

U=mono and/or diunsaturated fatty acid residue with 18 C-atoms.

In above definition the NMR measurement is performed on unstabilised fats, this means that the fats were subjected to the following temperature regime prior to the actual measurement: melt at 60 °C; 5 min at 60 °C; 1 hr at 0 °C; 1/2 hr at measurement temperature.

Above blends suitably comprise:

(i) an interesterified palm olein component with an iodine value of 50-70 and

(ii) a palm oil fraction with an SUS-content of 60-80 wt%, an SSU-content of 5-30 wt %, preferably 10-25 wt% and an SU2-content of 5-15 wt%.

Alternatively the blends comprise:

(i) an interesterified Shea-olein fraction and

(ii) a palm oil fraction with an SUS-content of 60-80 wt%, an SSU-content of 5-30 wt %, preferably 10-25 wt% and an SU2-content of 5-15 wt%.

The weight ratio wherein the fats (i) and (ii) defined above can be applied ranges from 60-90:40-10, preferably from 70-80:30-20.

Part of the invention are also filled chocolate bars, wherein the filling consists at least partly of the blends according to the invention. We found that our new blends do have very good aerating properties, it was found that it was easy to incorporate 25-45 vol% of air or of another gas in the fat blends. This can be achieved by whipping of the blends with a conventional whipper.

Therefore our new fillings can suitably be applied for the preparation of aerated filled chocolate bars.

Wrapper margarine, containing our novel fat composition are also part of our invention.

According to another embodiment of our invention our new fat blends can be used beneficially as part of the filling of filled chocolate products, optionally after whipping, to avoid posthardening of the fats upon storage of the chocolate

products.

EXAMPLES

1. A whipped cream was made using the following recipe:

Icing sugar	50 wt%
Fat	40 ..
Skimm.milk powder	10 ..

Fats that were applied were:

(A) a medium hardened blend of arachidic and soybean oil (ratio 65:35), having a trans content of about 35%.

(B) a mixture of wet-fractionated palm oil olein / palm oil and a palm oil fraction having 3 wt% S3; 70 wt% SUS; 14 wt% SSU and 10 wt% SU2 in a weight ratio of 20:50:30.

(C) a blend of an interesterified palm oil olein with an iodine value of 65 and a palm oil fraction having 6 wt% S3; 68 wt% SUS; 14 WT5 SSU and 10 wt% SU2 in a weight ratio of 80:20

The triglyceride composition of the different components and compositions is given below:

	Palm oil	Interest.Palm oil olein	wet fract. palm oil olein	(B)	(C)
SSS	9.7	5.5	0	4.8	5.6
SUS	41.5	8.3	32.6	45.9	20.2
SSU	9.2	18.9	5.7	8.8	17.9
SU2	33.2	43.7	50.5	33.2	37.0

the solid fat indexes of the different fat blends (A),(B) and (C) were as follows:

	Blend A	Blend B	Blend C
N20	23.2	14.3	22.2
N25	13	3.7	12
N30	5.6	0.9	7.1
N35	1.2	0	4.3

The ingredients were mixed in a Hobart mixer, the creams obtained were cooled to a temperature at which the mixtures could be whipped. The whip temperature and the amount of air incorporated are mentioned below:

Fat applied	temp of whipping	% air incorp.
A	16.4 oC	36 vol%
B	16.5	36
C	13.6	35

EP 0 815 738 A1

The creams were stored at 20 °C and the hardness of the creams were measured after different time intervals. The results are given below:

Fat applied	1 day	4 days	14 days
A	16		29
B	68		83
C		52	54

The hardness was measured using a Stevens texture analyser, having a cone of 60 °, using a speed of 0.5 mm/sec. The hardness is mentioned in grams.

From above results it can be concluded, that the posthardening was the least for the trans fat composition (A), that the posthardening was unacceptably high for composition (B) which is a composition according to EP 555,917, while for composition (C) according to the invention it was found that the posthardening was acceptable and close enough to the value found for the trans fat.

2. A whipped cream was made using the following recipe:

Icing sugar	50 wt%
Fat	40 wt%
Skimmed milk powder	10 wt%

Fats that were applied were:

1. a medium hardened blend of arachidic and soybean oil (ratio 65:35), having a trans content of about 50%
2. a blend of an interesterified palm olein / shea olein, and a palm oil fraction in a weight ratio of 75/25

The triglyceride composition of fat 2 is as given below:

SUS	23.2
SSU	19.6
SU2	34.4

The solid fat indexes of the fat blends were as follows:

	1	2
N20	24.4	19.4
N25	13.0	10.8
N30	4.8	5.5
N35	1.0	2.7

The ingredients were mixed in a Hobart mixer, the creams obtained were cooled to a temperature at which the mixtures could be whipped. The whip temperature and the amount of air incorporated are mentioned below:

Fat applied	Temp. of whipping	%air incorp.
1.	20.9	23 vol%
2.	19.6	19 vol%

The creams were stored at 20°C and at 25°C the hardness was measured after different time intervals. The results are given below:

Fat applied	1 day	1 week	2 weeks	1 month
at 20°C				
1.	34	49	56	
2.	23	51	74	
at 25°C				
1.	21	23	26	23
2.	13	16	18	16

The hardness was measured using a Stevens texture analyser, having a cone of 60°, using a speed of 0.5 mm/sec and a penetration depth of 2 mm. The hardness is measured in grams.

From above results it can be concluded that a similar amount of air was incorporated in both creams and that the posthardening was the least for the trans fat composition 1., and for blend 2. according to the invention it was found that the posthardening was acceptable and close enough to the value found for the trans fat.

Claims

1. Fat blend for low trans filling fat compositions or for wrapper margarine comprising triglycerides of the types SUS, SSU and SU2, wherein the fat blend has a trans fatty acid content <5 wt%, preferably <2 wt% and comprises the triglycerides
SUS and SSU in a weight ratio SUS:SSU<2, preferably 0.5-1.5, while SUS is present in an amount <34 weight %,preferably 15-25 wt% and SU2 is present in an amount <55 wt%,preferably 30-50 wt%, which fat blend preferably displays an solid fat index, measured by NMR-pulse on unstabilised fat at 20 °C of 10-35, more preferably 15-30,most preferably 20-25, wherein

S=saturated fatty acid residue with 16-18 C-atoms and

U=mono and/or diunsaturated fatty acid residue with 18 C-atoms.

2. Fat blend according to claim 1, wherein the blend comprises (i)an interesterified palm olein component with an iodine value of 50-70 and
(ii) a palm oil fraction with an SUS-content of 60-80 wt%, an SSU-content of 5-30 wt %, preferably 10-25 wt% and an SU2-content of 5-15 wt%.
3. Fat blend according to claim 1, wherein the blend comprises (i) an interestified Shea-olein fraction and
(ii) a palm oil fraction with an SUS-content of 60-80 wt%, an SSU-content of 5-30 wt %, preferably 10-25 wt% and an SU2-content of 5-15 wt%.
4. Fat blend according to claims 1-3 wherein the components (i) and (ii) are present in a weight ratio of 60-90:40-10.
5. Filled chocolate bar, wherein the filling consists at least partly of the blend according to claims 1-4.
6. Filled chocolate bar according to claim 5, wherein the filling is whipped to contain 25-45 vol% of air or another gas

7. Use of a fat blend in fillings for chocolate bars, wherein the fat blend according to claims 1-4 is used as part of the filling to avoid post-hardening of the fats of the filling.

5

10

15

20

25

30

35

40

45

50

55



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 20 1579

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,A	EP 0 555 917 A (UNILEVER) * claims 1,7 *	1,7	A23D9/00 A23D7/00 A23G3/00 A23G1/00
A	EP 0 547 658 A (UNILEVER NV ;UNILEVER PLC (GB)) * page 4, line 13 - line 39 * * claims 1,16-20 *	1,5,7	
A	WO 95 14392 A (LODERS CROKLAAN B.V.) * claims 1,11,15 *	1,5,7	
A	EP 0 536 824 A (UNILEVER) * claims 1,13-15 *	1,5,7	
A	EP 0 460 722 A (UNILEVER NV ;UNILEVER PLC (GB)) * page 2, line 24 - line 27 * * claims 1,7,8,11-13 *	1,5,7	
A	EP 0 521 549 A (UNILEVER NV ;UNILEVER PLC (GB)) 7 January 1993 * examples IV-VI * * claim 1 *	1,5,7	TECHNICAL FIELDS SEARCHED (Int.Cl.6) A23D A23G
A	PATENT ABSTRACTS OF JAPAN vol. 14, no. 363 (C-0746), 7 August 1990 & JP 02 132191 A (FUJI OIL CO LTD), 21 May 1990, * abstract *	1	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 October 1997	Examiner Dekeirel, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons a : member of the same patent family, corresponding document	

EPO FORM 1502 03 82 (P04001)

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶: A23D 9/00, 7/00, C11C 3/10	A1	(11) International Publication Number: WO 95/07619 (43) International Publication Date: 23 March 1995 (23.03.95)
(21) International Application Number: PCT/EP94/02893 (22) International Filing Date: 31 August 1994 (31.08.94) (30) Priority Data: 93307252.2 14 September 1993 (14.09.93) EP (34) Countries for which the regional or international application was filed: GB et al. (71) Applicant (for all designated States except US): LODERS CROKLAAN B.V. [NL/NL]; Zaandijkeweg 36, NL-1521 AX Wormerveer (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): CAIN, Frederick, William [GB/NL]; Dr. Bloekerstraat 12, NL-2271 VL Voorburg (NL). SMITH, Kevin, Warren [GB/GB]; 16 Arundel Drive, Bedford MK41 8HP (GB). ZWIKSTRA, Nico [NL/NL]; Johan Wagenaarlaan 16, NL-2102 GC Heemstede (NL).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: HEALTHY SPREAD FATS (57) Abstract Fat-compositions that display the following characteristics are very suitable fats for healthy margarines or spreads: (I): 5 - 45 wt % S ₂ U triglycerides; 0 - 60 wt % S _U ₂ ; 5 - 95 wt % U ₃ ; 0 - 8 wt % S ₃ ; S = saturated fatty acid: C ₁₆ -C ₂₄ , U = unsaturated fatty acid C ₁₈ ⁺ ; (II): (C ₁₈ -C ₂₄) : C ₁₆ ≥ 0.3; (III): < 5 % diglycerides; (IV): % SAFA < 35 wt %; (V): N ₅ = 12-30, N ₃₅ < 7, (N ₅ -N ₂₀) < 10.		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

Healthy spread fats:

Fats, suitable for use in margarine or spreads have been the subject of many studies in the past. According to US 4,425,371 margarine fats comprise (1) a randomly interesterified mixture of a) an oil high in linoleic acid (= C_{18:2}) and b) an oil or fat high in saturated fatty acids with at least 16 carbon atoms and (2) an olein fraction obtained after a fractionation of above interesterified mixture, which olein fraction has to have a specific N-line. Although the fats obtained display good properties as margarine-fats, those fats have the disadvantage that its N-line is not optimal. In particular its N₅ values and the differences between N₅ and N₂₀ are too high to make them good healthy spread-fats. Further its content of saturated fatty acids is still rather high. Moreover, these fats include fractions obtained after a hydrogenation. As hydrogenation will result in the formation of trans-fats, the margarine-blends in general will contain some of those undesirable trans fats. Another disadvantage is that for the preparation of the fat blends a rather complicated process must be performed, including an interesterification, a hydrogenation, a fractionation and a back-blending of the different products obtained.

Other known margarine-fats contain appreciable amounts of lauric acids. The presence of lauric residues, however, has a negative impact on the flavour of the products, because of hydrolysis that occurs during storage.

Recently a margarine oil low in trans-acids was disclosed in WO 91/08677. According to this documents the fats must fulfil the following requirements:

- (1) they must contain 84 - 95% triglycerides
- (2) and also 5 - 15% of diglycerides
- (3) less than 3% trans-acids should be present

- (4) less than 6% intermediate saturated fatty acids should be present
- (5) 25 - 45% of esterified $C_{18:2}$ should be present
- (6) 0 - 11% of esterified $C_{18:3}$ should be present
- 5 (7) 5 - 25% of esterified $C_{18:1}$ should be present
- (8) the fatty acid distribution should be non-random, so that the esterified $C_{18:0}$ present is mainly bonded at 1 and/or 3 and esterified unsaturated fatty acid is mainly bonded at 2-position of the triglycerides
- 10 (9) the fat must have a specific solid fat profile.

According to the specification the presence of diglycerides is essential in order to obtain a good mouthfeel and the required solid fat profile. We have found, that the

15 presence of diglycerides in margarine-fats has a negative impact on the crystallization behaviour (in particular: the velocity of crystallization) of the fats, when applied in margarines or spreads. Therefore, we have studied, whether we could find healthy fats suitable for the preparation of

20 margarines or spreads that are substantially free of diglycerides and laurics, have a low SAFA-content, while its N-line is such, that the fats are good structuring fats at refrigerator-temperature (So: N_5) and at ambient temperature (So: N_{20} or better its $N_5 - N_{20}$), while they

25 melt well in the mouth (So: N_{35}).

We found fat-compositions that fulfil above requirements. Therefore our invention concerns with fat-composition, suitable for healthy margarines or spreads, comprising the

30 following triglyceride-distribution:

- 5 - 45 wt% S_2U - triglycerides
 - 0 - 60 wt% SU_2 - triglycerides
 - 5 - 95 wt% U_3 - triglycerides
 - 0 - 8 wt% S_3 - triglycerides
- 35 S being: saturated fatty acid with 16-24 carbon atoms
 U being: mono- or polyunsaturated fatty acids with at least 18 carbon atoms

which fat-composition has a weight-ratio- ($C_{18} - C_{24}$) : (C_{16} saturated fatty acids of at least 0.3, contains less than 5 wt% diglycerides, while its SAFA-content is less than 35 wt% and its solid fat content, measured by NMR-pulse

5 (unstabilized), is:

N_5 : 12 - 30

N_{35} : less than 7

($N_5 - N_{20}$): less than 10

10 A preferred triglyceride-composition comprises:

10 - 25 wt% S_2U

5 - 40 wt% SU_2

50 - 84 wt% U_3

1 - 5 wt% S_3

15

Our novel fats preferably have SAFA-contents of less than 30 wt%, most preferably less than 25 wt%. The SAFA-content being defined as the total weight of saturated fatty acids (including the trans-acids) over the weight of all fatty

20 acids present. The preferred N-line (measured by NMR-pulse, not stabilized; i.e. using the following T-regime melt at 80°C; 10 min. at 60°C; 1 hr at 0°C, measured at measure-T after 30 min. at this T) is

25 N_5 : 12 - 18

$N_{35} < 3$

($N_5 - N_{20}$) < 5

All kind of fats, such as natural fats or oils but also
30 synthesized fat-components can be applied in our compositions. Examples of these fats are the following triglycerides: sunflower oil; olive oil; soybean oil; corn oil; PPO; StStO; BBO; PStP; PBO; PPLn; StStLn; BBLn; PBLn; StOSt; POST; POP; BOB; StOO; POO; BOO; BLnB; StLnSt; PLnSt;
35 PLnP; palm oil stearin; St₃; P₃; B₃; S₃, wherein S can be any combination of $C_{16}-C_{24}$; O₃; Ln₃; LnO₂; Ln₂O; (P= $C_{16:0}$; St= $C_{18:0}$; B= $C_{22:0}$; O= $C_{18:1}$; Ln= $C_{18:2}$). It is, however,

preferred to apply fats and fat mixtures that result in a behenic acid content in the composition of at least 1.5 wt%, preferably at least 4 wt%. Very suitable fat-compositions are obtained, when we apply a blend of fat components (A), (B) and (C), wherein:

(A) has an SUS level of more than 30 wt%, preferably more than 45 wt% and displays an $N_{20} > 20$, preferably above 45

(B) has an S_3 level above 45 wt%, preferably above 60 wt%

(C) has an $(U_2S + U_3)$ level above 45 wt%, preferably above 60 wt% while (A), (B) and (C) are present in amounts of 5 - 40 wt% (A), 0 - 10 wt% (B) and 50 - 95 wt% (C). The amounts of components (A), (B) and (C) are advantageously 15 - 25 wt% (A); 0.5 - 3 wt% (B) and 70 - 90 wt% (C).

15

Component (A) can be made by chemical or enzymic interesterification of a liquid oil and a saturated fatty acid, optionally followed by fractionation. Enzymically made fats (A) are preferred, in particular fats made by enzymic interesterification of a fatty acid having 16 - 24 carbon atoms and a liquid oil. The N_{25} (unstabilized) of those fats A is preferably more than 45, most preferably more than 55.

25 Fat (A) suitably is a shea fraction, illipe, or a fat having a high content of at least one of the triglycerides: BOB; BLnB; AOA; AOB or a cocoa butter equivalent ($A=C_{20:0}$).

A very convenient fat (B) is a palm oil stearin. This will be rich in tripalmitics.

Fat or oil (C) can be any liquid oil high in $(SU_2 + U_3)$. Examples are sunflower oil, olive oil, soybean oil, corn oil.

35

In a preferred embodiment of our invention the fat composition contains the triglycerides SUS and SSU in a

weight-ratio of more than 0.6, preferably more than 1.0, most preferably more than 5.0.

5 Spreads with a fat content of 20-80 w%, comprising at least part of the fats according to the invention are also part of the invention. These spreads display a hardness according to Haighton at 20°C of more than 50, preferably more than 120.

10 The spreads can be made by using conventional techniques for the preparation of margarines or low fat spreads (cf. EP 89082)

15 Examples:

1. Sunflower oil was blended with a fat, containing 65.4 wt% SLnS, wherein $S=C_{14}-C_{24}$, while St was present at 54.4 wt% in a weight-ratio of 85 SF: 15 StLnSt rich fat. The triglyceride-composition of this blend was:

25	$S_2U:$	16.8 wt%
	$SU_2:$	13.0 wt%
	$U_3:$	69.7 wt%
	$S_3:$	0.5 wt%

Its SAFA-content was 20.2 wt%, while it displayed the following N-profile:

30	N_5	= 12
	N_{35}	= 0
	N_5-N_{20}	= 7.5

35 The StlnSt applied was obtained by an enzymic conversion (1.3. specific) of sunflower oil and stearic acid, followed by fractionation.

2. Sunflower oil, palm oil stearin and StLnSt were blended in a weight ratio of:

78 SF, 3 palm oil stearin and 19 StLnSt-rich fat

- 5 The triglyceride composition of this blend was:

	S ₂ U:	21.3 wt%
	SU ₂ :	12.2 wt%
	U ₃ :	64 wt%
10	S ₃ :	2.6 wt%

Its SAFA-content was 24.7 wt%, while it displayed the following N-profile:

15	N ₅ :	17.4
	N ₃₅ :	0
	N ₅ -N ₂₀ :	7.2

- 20 The StLnSt-rich fat applied was obtained by an enzymic conversion (1.3) of sunflower oil and stearic acid, followed by fractionation. Its StLnSt content was 60 wt%

3. Sunflower oil, palm oil stearin, BOB -rich fat and BOO-rich fat were blended in a weight ratio of 55 SF, 5 palm oil stearin, 20 BOB-rich fat and 20 BOO-rich fat. Its triglyceride-composition was:

	S ₂ U:	26.3
30	SU ₂ :	23.8
	U ₃ :	45.3
	S ₃ :	4.4

The SAFA-content of this blend was 34.0 wt%, while it displayed the following N-profile:

35	N ₅	=	28.1
	N ₃₅	=	1.8
	N ₅ -N ₂₀	=	5.2

The BOB-rich fat and BOO-rich fat were obtained by an 1.3- enzyme-specific conversion of high oleic sunflower oil and behenic acid, followed by fractionation into two products. The products obtained contained 73 wt% BOB and 64.1 wt% SOO (behenic content was :37 wt%).

4. A margarine was made, using the fatblend of example 3 the following recipe was applied:

10	<u>Fatphase</u>	wt%
	fat-blend	83.1
	emulsifier	0.3
	colour/flavour	0.05
15	<u>Waterphase</u>	wt%
	water	16.0
	S.M.P.	0.4
	preservative	0.05
	organic acid	0.04
20	pH = 4.7	

A premix was made from the components; the premix was pasteurized at 85°C and cooled to 45°C the premix was led through an ACA-system, applying a throughput of 40 g/min. The A, C and A-units were stirred at respectively 800, 400 and 600 rpm. The outlet-temperatures were: 16.7°C; 17.4°C and 14.7°C.

A margarine was obtained with the hardness (C-values in g/cm² after 3 days storage at T indicated) as given in the table below.

<u>C-values of the margarines</u>		
Example	C at 5°C	C at 20°C
35 5	>3000	2340

5. Halvarines were made, using 2 different fat blends, i.e. the fatblend of example 2; and a commercial, low-SAFA blend. (= 13% inter-esterified hardened palm oil/hardened palm-kernel and 87% sunflower oil). The following recipe was applied:

	<u>Fatphase</u>	wt%
	fatblend	40.0
	emulsifier	0.3
10	colour/flavour	0.05

	<u>Waterphase</u>	wt%
	water	56.4
	S.M.P.	1.5
15	gelatin	1.5
	preservative	0.15
	organic acid	0.07
	pH = 5.1	

- 20 A premix was made from the components; the premix was pasteurized at 85°C and cooled to 45°C. The premix was led through an ACA-system, using stirring-speeds of 800, 1300 and 600 rpm. The throughput was 40 g/min. The following exit-temperatures were used:

	<u>using:</u>	A	C	A
	fat of example 2	16.4	22.3	15.4
	in Es-fat	13.2	19.1	14.6

30

The products obtained displayed the following C-values:

	<u>Fatblend</u>	<u>C₅</u>	<u>C₁₅</u>
35	example 2	200	80
	in Es-fat	85	67

So the hardness of our new products is slightly higher than the hardness when using a commercial fat blend.

- 5 6. Fat blends were made with the composition as given in the table below. The properties of the fat blends are given in this table as well.

Fat phase	N ₅	N ₃₅	N ₅ -N ₂₀	SAFA	S ₃	S ₂ U	SU ₂	U ₃	$\frac{C_{18}-C_{24}}{C_{16}}$
20% St Ln St 80 Sunflower oil	16.7	0	7.9	23	0.7	21.3	12.6	65.6	15.1
7.5% BlnB 10% StLnSt 82.5% Sunflower oil	15.0	0	8.1	22	0.7	19.2	12.8	67.6	17.1
15% BOB 85% Sunflower oil	14.9	6.5	1.8	20.8	0.8	16.6	12.9	69.7	19.3
15% BlnB 85% Sunflower oil	14.5	5.7	1.5	21.0	0.7	17.0	13.0	69.7	13.2

Claims

1. Fat-composition, suitable for healthy margarines or spreads, comprising the following triglyceride-distribution:

5 - 45 wt% S_2U - triglycerides

0 - 60 wt% SU_2 - triglycerides

5 - 95 wt% U_3 - triglycerides

0 - 8 wt% S_3 - triglycerides

S being: saturated fatty acid with 16-24 carbon atoms

U being: mono-or polyunsaturated fatty acids with at least 18 carbon atoms

which fat-composition has a weight-ratio ($C_{18} - C_{24}$) : C_{16} -saturated fatty acids of at least 0.3; contains less than 5 wt% diglycerides, while its SAFA-content is less than 35 wt% and its solid fat content, measured by NMR-pulse (unstabilized), is:

N_5 : 12 - 30

N_{35} : less than 7

$(N_5 - N_{20})$: less than 10

2. Fat-composition according to claim 1, wherein the triglyceride-distribution comprises:

10 - 25 wt% S_2U

5 - 40 wt% SU_2

50 - 84 wt% U_3

1 - 5 wt% S_3

3. Fat-composition according to claims 1 or 2, wherein the SAFA-content is less than 30 wt%, preferably less than 25 wt%.

4. Fat-composition according to claims 1 - 3, wherein the solid fat-content is:

N_5 : 12 - 18

$N_{35} < 3$

$$(N_5 - N_{20}) < 5$$

5. Fat-composition according to claims 1 - 4, wherein the fat-composition contains at least 1.5 wt%, preferably at least 4 wt% of behenic acid.
6. Fat-composition according to claims 1 - 5, wherein the composition is a blend of at least two of the following triglycerides: sunflower oil, olive oil; corn oil; soybean oil; StOSt; POST; POP; BOB; StOO; POO; BOO; BLnB; StLnSt; PLnSt; PLnP; palm oil stearin; St₃; P₃; B₃; O₃; Ln₃; LnO₂; Ln₂O (P=C_{16:0}; St=C_{18:0}; B=C_{22:0}; O=C_{18:1}; Ln=C_{18:2}).
7. Fat-composition according to claims 1 - 5, wherein the composition is a blend of fat components (A), (B) and (C), wherein:
 - (A) has an SUS level of more than 30 wt%, preferably more than 45 wt% and displays an N₂₀ > 20, preferably above 45
 - (B) has an S₃ level above 45 wt%, preferably above 60 wt%
 - (C) has an (U₂S + U₃) level above 45 wt%, preferably above 60 wt% while (A), (B) and (C) are present in amounts of 5 - 40 wt% (A), 0 - 10 wt% (B) and 50 - 95 wt% (C).
8. Fat-composition according to claim 7, wherein (A), (B) and (C) are present in amounts of 15 - 25 wt%, 0,5 - 3 wt% and 70 - 90 wt%.
9. Fat-composition according to claim 7, wherein fat-component (A) is made by enzymic interesterification of a fatty acid, having 16 - 24 carbon atoms and a liquid oil.

10. Fat-composition according to claim 7, wherein fat-component (A) displays an $N_{25} > 45$, preferably > 55 .
11. Fat-composition, according to claim 7 wherein fat-component (B) is a palm oil stearin.
12. Fat-composition according to claim 7, wherein fat A is a shea fraction, illipe, a fat having a high content of at least one of the triglycerides: BOB, BLnB, AOA; AOB or a cocoa butter equivalent ($A=C_{20:0}$)
13. Spread with a fat-content of 20 - 80 wt%, wherein at least part of the continuous fat-phase consists of a fat according to claim 1 - 12.
14. Spread according to claim 13, wherein the spread displays a hardness according to Haighton at 20°C of more than 50, preferably more than 120.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP 94/02893

A. CLASSIFICATION OF SUBJECT MATTER IPC 6 A23D9/00 A23D7/00 C11C3/10		
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 6 A23D C11C		
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)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO,A,94 12045 (UNILEVER PLC) 9 June 1994 see claims 3,4,9 ---	1,7,8
A	US,A,4 883 684 (THE PROCTER & GAMBLE COMPANY) 28 November 1989 see column 6 - column 9; claims 1,5,7 ---	1,5-9, 13,14
A	DATABASE WPI Week 8806, Derwent Publications Ltd., London, GB; AN 88-038462 & JP,A,62 295 996 (TSUKISHIMA SHOKUHIN) 23 December 1987 see abstract --- -/--	1,5-9
☒ Further documents are listed in the continuation of box C. ☒ Patent family members are listed in 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 '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 3 November 1994		Date of mailing of the international search report 17. 11. 94
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax (+ 31-70) 340-3016		Authorized officer Kanbier, D

INTERNATIONAL SEARCH REPORT

International application No.

PCT/EP 94/02893

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CH,A,633 684 (ASAHI DENKA KOGYO KK) 31 December 1982 see page 3, right column see page 6; claims 1,5,7 ---	12
A	EP,A,0 502 697 (FUJI OIL CO LTD) 9 September 1992 see page 3, line 19 - line 33; claims 1,2; examples 5,9,11,14; tables 2,4 ---	1,3, 6-10,12
A	EP,A,0 209 176 (UNILEVER NV) 21 January 1987 see page 4, line 20 - line 30; claims 6-8,10,41,42; example 1 ---	1,3,6,7, 13,14
A	EP,A,0 430 870 (PERRIER-SANTE S.A.) 5 June 1991 see page 2, line 5-9; example 2 see page 7, line 54 - line 57; claims 5,13,18,20 ---	1,3,6,7, 11
A	EP,A,0 326 198 (THE PROCTER & GAMBLE COMPANY) 2 August 1989 see claims 1-5; example 1 ---	1-3,6
A	WO,A,91 15126 (THE PROCTER & GAMBLE COMPANY) 17 October 1991 see page 16, line 5-10; claims 1,3,5,9,10; examples 1,4 see page 15, line 18 - line 33 ---	6,7,11
A	WO,A,91 09533 (THE PROCTER & GAMBLE COMPANY) 11 July 1991 see claims 1,3; examples 1,3,8,9 -----	2,3,6,7

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/EP 94/02893

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9412045	09-06-94	AU-B- 5625994	22-06-94
US-A-4883684	28-11-89	NONE	
CH-A-633684	31-12-82	NONE	
EP-A-0502697	09-09-92	JP-A- 5211841	24-08-93
		JP-A- 5049399	02-03-93
		AU-B- 644042	02-12-93
		AU-A- 1138292	10-09-92
		JP-A- 6105655	19-04-94
		US-A- 5271950	21-12-93
EP-A-0209176	21-01-87	NL-A- 8501957	02-02-87
		AU-B- 579483	24-11-88
		AU-A- 5976686	15-01-87
		BE-A- 905066	08-01-87
		DE-A- 3661396	19-01-89
		JP-A- 62014743	23-01-87
		US-A- 4791000	13-12-88
EP-A-0430870	05-06-91	FR-A- 2653972	10-05-91
EP-A-0326198	02-08-89	US-A- 4948811	14-08-90
		AT-T- 106672	15-06-94
		AU-A- 2876289	27-07-89
		DE-D- 68915791	14-07-94
		DE-T- 68915791	27-10-94
		JP-A- 2003498	09-01-90
WO-A-9115126	17-10-91	US-A- 5064670	12-11-91
WO-A-9109533	11-07-91	AU-A- 7163991	24-07-91
		TR-A- 25448	01-05-93
		US-A- 5215779	01-06-93

HEALTHY FAT-CONTAINING BLENDS

Patent number: EP0731645
Publication date: 1996-09-18
Inventor: CAIN FREDERICK WILLIAM (NL); QUINLAN PAUL THOMAS (GB); SMITH KEVIN WARREN (GB); ZWIKSTRA NICO (NL)
Applicant: LODERS CROKLAAN BV (NL)
Classification:
- international: **A23D9/00; A23G1/00; A23G3/00; A23D9/00; A23G1/00; A23G3/00;** (IPC1-7): A23G1/00; A23D9/00; A23G3/00; A23G9/02
- european:
Application number: EP19950901424 19941123
Priority number(s): EP19950901424 19941123; WO1994EP03881 19941123; EP19930309482 19931129

Also published as: EP0731645 (B1)**Report a data error here**

Abstract not available for EP0731645

Data supplied from the **esp@cenet** database - Worldwide



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶: A23G 1/00, A23D 9/00, A23G 3/00, 9/02	A1	(11) International Publication Number: WO 95/14392 (43) International Publication Date: 1 June 1995 (01.06.95)
(21) International Application Number: PCT/EP94/03881 (22) International Filing Date: 23 November 1994 (23.11.94) (30) Priority Data: 93309482.3 29 November 1993 (29.11.93) EP (34) Countries for which the regional or international application was filed: GB et al. (71) Applicant (for all designated States except US): LODERS CROKLAAN B.V. [NL/NL]; Zaandijkeweg 36, NL-1521 AX Wormerveer (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): CAIN, Frederick, William [GB/NL]; Dr. Bloekerstraat 12, NL-2271 VL Voorburg (NL). QUINLAN, Paul, Thomas [GB/GB]; 9 Ely Way, Kempston, Bedford MK42 8TW (GB). SMITH, Kevin, Warren [GB/GB]; 16 Arundel Drive, Bedford MK41 8HP (GB). ZWIKSTRA, Nico [NL/NL]; Johan Wagenaarlaan 16, NL-2102 GC Heemstede (NL). (74) Agent: UNILEVER N.V.; Patent Division, P.O. Box 137, NL-3130 AC Vlaardingen (NL).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: HEALTHY FAT-CONTAINING BLENDS (57) Abstract Blends of sugar and a triglyceride component, wherein the triglyceride component comprises $\geq 40\%$ SU_2 and 3-50 % S_2U while its $N_{20} > 35$ and its $N_{30} < 10$ (S = saturated fatty acid 18-24 C atoms, U = unsaturated fatty acid ≥ 18 C atoms) are suitable for the preparation of low-SAFA filling fat compositions or low-SAFA ice-cream coatings.		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LU	Luxembourg	SN	Senegal
CN	China	LV	Latvia	TD	Chad
CS	Czechoslovakia	MC	Monaco	TG	Togo
CZ	Czech Republic	MD	Republic of Moldova	TJ	Tajikistan
DE	Germany	MG	Madagascar	TT	Trinidad and Tobago
DK	Denmark	ML	Mali	UA	Ukraine
ES	Spain	MN	Mongolia	US	United States of America
FI	Finland			UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

HEALTHY FAT-CONTAINING BLENDS

Blends of a sugar and a fat component are often used in confectionery products, either at ambient or at frozen temperature conditions. Examples of the above products are encapsulated fillings, such as pralines and ice-cream products provided with a coating, containing such blends. A problem with the known blends was that so far high SAFA contents (= contents of saturated and/or trans-fatty acids in the triglyceride component) had been required in order to achieve the required product performance, such as acceptable texture and good oral melting characteristics. Alternatively, the product performance, in particular the hardness and cool-melting behaviour, was unsatisfactory when lower SAFA contents were applied.

According to EP 547,651 chocolate fillings comprise, as a fat phase, a fat containing 18-28 wt.% of C_{16} - C_{18} saturated fatty acids, 35-45 wt.% of trans-unsaturated fatty acids and 25-35 wt.% of cis-unsaturated fatty acids. Therefore, these compositions are high in SAFA and are not free of trans-acids.

According to EP 555,917 filling fats comprise non-temper, non-trans fats comprising : 35-80 wt.% of the polymorphic SOS fat; less than 3 wt.% of the trisaturated S_3 ; 7-60 wt.% of (U_2S+U_3) triglycerides and less than 40 wt.% of SSU-triglycerides while the SUS : SSU ratio < 6.

These fats will be relatively high in SAFA while the triglycerides display such a solid fat content at 20°C (= N_{20}) that the N_{20} /SAFA ratio is low. This last requirement makes the fats not optimal for our purpose as filling fat or as ice-cream coating fat.

35

- 2 -

In EP 500,178 we have disclosed non-lauric, non-temper
filling fats with an N-line of : $N_{20} > 45$; $N_{30} < 12$ and $N_{32.5}$
< 2.0. These fats can be obtained as olein fraction of the
fractionation of a hardened mixture of, e.g., soybean oil
5 and palm oil olein or cottonseed oil. The last-mentioned
requirement means that the fats are not trans-free and are
high in SAFA.

We have now found new blends of at least a sugar and a
10 triglyceride component that can be applied in confectionery
products, wherein the SAFA content of the triglyceride
component is lower than that usually applied, while the
products obtained display a performance similar to that of
products based on fats with high SAFA levels. It should be
15 understood that by SAFA content the total of saturated and
trans-unsaturated fatty acid residues is meant.

Therefore, our invention concerns blends of a sugar
component and a triglyceride component, the triglyceride
20 component comprising:

at least 40 wt.% of SU_2 triglycerides;

3 - 50 wt.% of S_2U triglycerides,

which triglyceride component displays a solid fat content
(N) at the temperature indicated of:

25 $N_{20} > 35$, preferably > 60 ;

$N_{30} < 10$, preferably < 5 ,

(N measured by NMR-pulse for fats stabilised for 40 hours
at 20°C)

S being saturated fatty acid with 18-24 C atoms and U being
30 unsaturated fatty acid with ≥ 18 C atoms.

The triglyceride component in these blends has a SAFA
content of at most 45 and is substantially free of trans-
unsaturated fatty acid residues. Therefore, our blends are
35 healthier than the common blends known for this purpose.
Very suitable blends are obtained when the triglyceride
component of the blend displays a ratio between its N_{20}

- 3 -

(stab. at 20°C) and its SAFA content, so $N_{20}/SAFA$, of more than 1.2, in particular more than 1.5.

Suitable triglyceride compositions that fulfil the above-mentioned criteria are triglyceride compositions rich in BOO, StOO, OStO, OBO or mixtures thereof. These compositions will also contain BOB, BBO, StOSt or StStO as the S_2U component. Such triglycerides can be made by interesterification of natural fats, in particular by applying chemical or enzymic interesterification, using a fatty acid as a source for the fatty acid moiety that has to be introduced into the natural fat. The above-mentioned interesterification techniques are standard techniques (B = Behenic; St = Stearic; O = Oleic).

In the above blends, preferably 35-75 wt.%, more preferably 40-65 wt.%, of the triglyceride component is present. The sugar component can be any known sugar, such as glucose, fructose, sucrose, maltose, maltodextrin, etc., the nature of which is not critical. It should be understood that polydextrose-type materials are also considered to be part of the sugar component and can therefore also be applied.

In addition to the triglyceride component mentioned above, the blend can also contain a liquid oil, such as soybean oil, sunflower oil, maize oil, olive oil, hazelnut oil, groundnut oil or rapeseed oil. If the blend contains a liquid oil and a triglyceride rich in SOO, it is preferred to apply a weight ratio of liquid oil : SOO = (10-90):(90-10).

Very good results can be obtained if our blends comprise a triglyceride component that contains at least 10 wt.%, preferably at least 25 wt.%, of behenic acid. The behenic acid causes the digestibility of the triglycerides to decrease and therefore the calorific value of the blend is

- 4 -

decreased as compared with normal fat components (based on C_{12} - C_{18} fatty acids).

Although the triglyceride component, S_2U , also comprises
5 StUSt (St = stearic acid), it is preferred that our
triglyceride component contains less than 25 wt.% of StUSt
(U = unsaturated fatty acid, C_{18}^+). Very suitable blends are
obtained when the S_2U triglyceride component comprises SLnS
and SOS triglycerides in a weight ratio of $\frac{SLnS}{SOS} < 0.35$
10 (S = saturated fatty acid C_{18} - C_{24} ; Ln = $C_{18:2}$; O = $C_{18:1}$).

It was found that the good product performance obtained,
using fats high in Ln, can be further improved by applying
15 fats with such ratios for SLnS : SOS. In particular, the
crystallisation rate is faster and processing becomes
easier.

We further found that the crystallisation rate is far
20 better for fats containing linoleic acid residues if the
linoleic present in the 2-position of the SU_2 -triglyceride
is less than 50%, preferably less than 30%, of the total
unsaturated fatty acids present in the 2-position of these
 SU_2 -triglycerides.

25 In order to achieve better structuring properties, we
prefer that the triglyceride component of our blends also
comprises 0.1-10 wt.% of a trisaturated triglyceride, in
particular a palm oil stearin or a by-product of an enzymic
30 fat preparation.

Part of our invention is also a filling fat composition
comprising a blend according to our invention, which blend
contains 35-75 wt.%, preferably 40-65 wt.%, of the
35 triglyceride component mentioned above and at least a sugar
component. These filling fat compositions preferably also
contain one or more of the following components: milk

- 5 -

powder; skimmilk powder; proteins, in particular whey powder or caseinate; a filling component, in particular cellulose or inulin.

- 5 The filling fat compositions can contain the blend of fat and sugar *per se* or this blend can first be used for the preparation of a fat-continuous aqueous emulsion, which emulsion then can be part of the filling fat composition. If an emulsion is made first, this emulsion should contain
10 5-50 wt.% of fat and not more than 25 wt.% of water.

- The filling fat compositions of the invention can be prepared by mixing of our blend of fat and sugar with the other ingredients for the filling, such as milk powder
15 and/or other filling components. It is important, however, that the blend thus obtained be tempered at a temperature below 20°C, in particular below 15°C. This low tempering temperature is conducive to the formation of crystals. Another method for the production of our filling fat
20 compositions comprises blending of the components at temperatures above 40°C, cooling the blend to 5-25°C and adding a working amount of seed crystals having a particle size of 1-200 µm, preferably 10-100 µm. As seeds, triglycerides high in SOS, SSO or S₃ can be applied (S =
25 C₁₆-C₂₄ saturated fatty acid; O = oleic acid). Suitable working amounts are 0.01-1 wt.%, calculated on the fat.

- Encapsulated filling fat compositions, wherein the filling fat according to the invention is encapsulated in a
30 chocolate or chocolate-like coating material, are also part of the invention.

- Encapsulated, low-calorie filling fat compositions are obtained by encapsulating the filling fat compositions
35 containing the fat-continuous aqueous emulsion, e.g. in a chocolate shell. A further calorie reduction is obtained

- 6 -

when at least part of the sugar component present in these compositions consists of polydextrose.

We further found that our blends can be successfully used
5 in ice-cream coatings. So, an ice-cream coating comprising
40-75 wt.% of the triglyceride component mentioned above
and at least a sugar is also part of our invention. Very
suitable blends, in particular those suitable for the
preparation of non-brittle, non-adhering ice-cream
10 coatings, are obtained by applying fats with a non-
stabilized N-line of : $N_0 = 60-95$; $N_{20} = 10-45$ and
 $N_{25} < 15$. This additional criterion for the fats thus means
a selection within the fats that have been formulated
above.
15
Coated ice creams are, of course, also part of our
invention.

- 7 -

EXAMPLESI. Fillings A and B

I.1 Fillings were made, using the following recipe :

	<u>wt.%</u>
Fat phase	50.0
Sugar	40.0
Skimmilk powder	10
Lecithin	0.3

Two different fillings were made, using two different fat phases, i.e.

filling A, using fat A (rich in StOO),

filling B, using fat B (a mixture of palm fractions),
the composition of fats A and B being :

	<u>Fat A</u> (wt.%)	<u>Fat B (comparative)</u> (wt.%)
SU ₂	77.9	27.0
S ₂ U	17.3	64.0
SAFA	37.7	53.1
N ₂₀	51.2	48.0
N ₃₀	0.5	5.0
N ₂₀ /SAFA	1.35	0.9

I.2 The fillings were made by mixing of the ingredients, refining the blend on a 3-roll refiner and conching the blend. Filling A was tempered at 10°C; filling B was tempered at 24°C. The fillings were stored at 7°C for 16 hours and then further stored at 13°C.

I.3 After 1 week, the fillings were evaluated by a trained panel (at 20°C).

The hardness of the two fillings was similar but the meltdown of filling A was much quicker, while this filling A was also much cooler during melting than filling B.

- 8 -

So, filling A is lower in SAFA and displays better oral properties than filling B.

II Filling C

II.1 One more filling (= C) was made, using the recipe of Example I.1. The fat applied (= fat C), however, had the following composition :

Fat C (rich in BOO)	
	(wt.%)
SU ₂	73.6
S ₂ U	22.6
SAFA	45
Behenic %	37.2
N ₂₀	81.2
N ₃₀	0.6
N ₂₀ /SAFA	1.8

II.2 The fillings were made according to I.2; tempering, however, was performed at 18°C.

II.3 After 1 week, applying a temperature of 20°C, we found that the hardness of filling C was similar to that of filling B (44 and 42, respectively). An expert panel found that the meltdown and coolness of fillings B and C were also similar.

So, a filling with lower SAFA and lower calorie intake and with similar hardness and oral properties was obtained.

III Fillings D and E

III.1 Two more fillings (D and E) were prepared, using the following recipes :

- 9 -

	<u>D</u>	<u>E</u>
BOO-rich fat C	45	40
Sugar	35	35
Skimmilk powder	10	5
Hazelnut paste	10	20
Lecithin	0.4	0.4

So, the fat phase of filling D consists of 90% of BOO-rich fat and of 10% of hazelnut oil; the fat phase of filling E consists of 80% of BOO-rich fat and of 20% of hazelnut oil, the fat phases D and E having the following composition :

	<u>Fat D</u> (wt.%)	<u>Fat E</u> (wt.%)
SU ₂	67.7	61.8
S ₂ U	20.7	18.8
SAFA	41.7	38.4
Behenic %	33.5	29.8
N ₂₀	68.0	54.7
N ₃₀	0.6	0.1
N ₂₀ /SAFA	1.6	1.4

III.2 The fillings were made according to I.2. Tempering was performed at 5°C.

III.3 From an evaluation by an expert panel it could be concluded that low-SAFA, low-calorie fillings were obtained that displayed good hardness, good meltdown, good cool-melting and excellent flavour release properties.

IV. Fillings using seeding

IV.1 A filling composition was made with the recipe according to filling D of Example III. The filling was placed in an LFRA kettle at 50°C and was cooled with stirring to 17°C.

- 10 -

IV.2 When the filling reached 17°C, it was seeded with 0.1 wt.% of cocoa butter seeds with stirring. Stirring was continued for half an hour at 17°C.

IV.3 After half an hour, Al-cups were filled and placed in a wind-cooled cabinet at 14°C for an hour.

IV.4 The samples were kept in a storage cabinet at 13°C for 18 hours, after which time Stevens hardness was measured. A hardness of about 420 was found.

IV.5 The samples were restored at 20°C for 24 hours and Stevens hardness was measured again. A hardness of about 158 was found.

IV.6 All products had excellent oral properties and good flavour.

V. Ice-cream coatings F and G

V.1 Two ice-cream coatings were made, using the following recipe :

	<u>wt. %</u>
Fat phase	59.2
Sugar	25.8
Cocoa powder	13.0
Skimmilk powder	1.7
Lecithin	0.3

Coatings F and G were made, using, respectively, fats C and G (= cocoa butter) with the following compositions :

	<u>Fat C</u> (wt. %)	<u>Fat G (= cocoa butter)</u> (wt. %)
SU ₂	73.6	8.2
S ₂ U	22.6	89.8
SAFA	45.0	62.0

- 11 -

Behenic %	37.2	-
N ₂₀ (stab.)	81.2	81.9
N ₃₀ (stab.)	0.6	38.6
N ₂₀ (stab.)/SAFA	1.8	1.3
N ₀ (not stab.)	84	-
N ₂₀ (not stab.)	36.6	-
N ₂₅ (not stab.)	4	-

V.2 The coatings were prepared by mixing of the ingredients, refining the blend on a 3-roll refiner and conching.

The coatings were kept at about 40°C and ice creams were dipped into the coating compositions.

V.3 Dripping times and drying times were measured. The weight of the coating was determined. An evaluation for brittleness was made.

The mean result of 10 determinations was found to be :

	<u>Coating F</u>	<u>Coating G</u>
Dripping time (sec.)	8.0	8.6
Drying time (sec.)	54.4	53.0
% Coating on total product	23.3	20.6
Brittleness	5	2

(5 = not brittle; 1 = very brittle)

So, coatings could be made with a lower SAFA content and a lower calorie intake, leading to good-tasting, non-brittle, coated ice creams which can be processed in the same way as those of the comparative coating (= G) based on cocoa butter.

- 12 -

CLAIMS

1. Blend of a sugar component and a triglyceride component, the triglyceride component comprising:
at least 40 wt.% of SU_2 triglycerides and
3 - 50 wt.% of S_2U triglycerides,
which triglyceride component is free of trans-unsaturated fatty acid residues and displays a solid fat content (N) at the temperature indicated of:
 $N_{20} > 35$, preferably > 60 ;
 $N_{30} < 10$, preferably < 5 ,
(N measured by NMR-pulse for fats stabilised for 40 hours at 20°C),
S being saturated fatty acid with 18-24 C atoms and U being unsaturated fatty acid with ≥ 18 C atoms.
2. Blend according to Claim 1, wherein the triglyceride component has a SAFA content of at most 45.
3. Blend according to Claim 1 or 2, wherein the triglyceride component displays a ratio between its N_{20} (stab. at 20°C) and its SAFA content, so $N_{20}/SAFA$, of more than 1.2, in particular more than 1.5.
4. Blend according to Claim 1, wherein the triglyceride component is rich in B00, St00, OStO, OBO or mixtures thereof and is obtained by chemical or enzymic interesterification, optionally followed by fractionation (B=Behenic, St=Stearic; O=Oleic).
5. Blend according to Claims 1-4, wherein the blend also comprises a liquid oil, such as soybean oil, sunflower oil, maize oil, olive oil or rapeseed oil.

- 13 -

6. Blend according to Claim 5, wherein the blend contains a liquid oil and a triglyceride rich in S_{OO} ($S=C_{18}-C_{24}$ saturated; $O=oleic$) in a weight ratio of liquid oil : $S_{OO} = (10-90):(90-10)$.
7. Blend according to Claims 1-6, wherein the triglyceride component contains at least 10 wt.% of behenic acid.
8. Blend according to Claims 1-7, wherein the SU_2 -triglycerides contain linoleic acid residues, which are distributed over the SU_2 -triglycerides, in such a way that less than 50%, preferably less than 30%, of the total unsaturated fatty acids present in the 2-position consists of linoleic acid.
9. Blend according to Claims 1-8, wherein the triglyceride component also comprises 0.1-10 wt.% of a trisaturated triglyceride, in particular a palm oil stearin or a by-product of an enzymic fat preparation.
10. Blend according to Claim 1, wherein the S_2U -triglyceride component comprises $SLnS$ and SOS triglycerides in a weight ratio of $\frac{SLnS}{SOS} < 0.35$
 $(S = \text{saturated fatty acid } C_{18}-C_{24}; \quad Ln = C_{18:2};$
 $O = C_{18:1})$.
11. Filling fat composition comprising a blend according to Claims 1-10, which blend contains 35-75 wt.%, preferably 40-65 wt.%, of the triglyceride component.
12. Filling fat composition according to Claim 11, wherein the composition also contains one or more of the following components: milk powder; skimmilk powder; proteins, in particular whey powder or caseinate; a filling component, in particular cellulose or inulin.

- 14 -

13. Filling fat composition according to Claim 12, wherein the blend of triglyceride component and sugar component is part of a fat-continuous aqueous emulsion containing 5-50 wt.% of fat and not more than 25 wt.% of water.
14. Filling fat composition according to Claim 13, wherein the sugar component at least partly consists of a polydextrose.
15. Encapsulated filling fat compositions, wherein the filling fat according to Claims 11-14 is encapsulated in a chocolate or chocolate-like coating material.
16. Ice-cream coating composition comprising 40-75 wt.% of the triglyceride component of Claim 1 and at least a sugar.
17. Coated ice creams, wherein the coating consists of the ice-cream coating according to Claim 16.
18. Process for the preparation of filling fat compositions according to Claims 11-14, wherein the components of the composition are mixed and the mixture obtained is subjected to tempering at a temperature below 20°C, preferably below 15°C.
19. Process for the preparation of filling fat compositions according to Claims 11-14, wherein the components are mixed above 40°C, the mixture is cooled to 5-25°C and a working amount of fat seeds having a particle size of 1-200 μm is added.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 94/03881

A. CLASSIFICATION OF SUBJECT MATTER		
IPC 6	A23G1/00	A23D9/00 A23G3/00 A23G9/02
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 6 A23D A23G		
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)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 547 651 (UNILEVER N.V. ET AL.) 23 June 1993 cited in the application see the whole document ---	1-3
A	EP,A,0 555 917 (UNILEVER N.V. ET AL.) 18 August 1993 cited in the application see the whole document ---	1
A	EP,A,0 500 178 (UNILEVER N.V. ET AL.) 26 August 1992 cited in the application see the whole document ---	1
A	EP,A,0 502 697 (FUJI OIL COMPANY LIMITED) 9 September 1992 see abstract; examples 1-6 -----	1
☐ Further documents are listed in the continuation of box C. ☒ Patent family members are listed in 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 "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		Date of mailing of the international search report
16 March 1995		05.04.95
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax (+ 31-70) 340-3016		Authorized officer Alvarez Alvarez, C

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 94/03881

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP-A-0547651	23-06-93	AU-B-	647980	31-03-94
		AU-A-	2987392	10-06-93
		CA-A-	2084706	10-06-93
		JP-A-	6078673	22-03-94

EP-A-0555917	18-08-93	CA-A-	2089055	13-08-93
		US-A-	5288513	22-02-94

EP-A-0500178	26-08-92	AU-B-	645392	13-01-94
		AU-A-	1100592	03-09-92
		CA-A-	2061308	22-08-92
		JP-A-	5091835	16-04-93

EP-A-0502697	09-09-92	JP-A-	5211841	24-08-93
		JP-A-	5049399	02-03-93
		AU-B-	644042	02-12-93
		AU-A-	1138292	10-09-92
		JP-A-	6105655	19-04-94
		US-A-	5271950	21-12-93

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 728 415 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
28.08.1996 Bulletin 1996/35

(51) Int Cl.⁶: **A21D 2/16**, A21D 13/00,
A21D 13/08, A21D 10/00

(21) Application number: **96200367.9**

(22) Date of filing: **15.02.1996**

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IE IT LI NL PT SE

• **Klaassen, Maarten J.**
1531 AM Wormer (NL)

(30) Priority: **22.02.1995 EP 95200428**

(74) Representative: **Sikken, Antonius H. J. M. et al**
UNILEVER N.V.,
Patent Division,
P.O. Box 137
3130 AC Vlaardingen (NL)

(71) Applicant: **LODERS CROKLAAN B.V.**
NL-1521 AX Wormerveer (NL)

(72) Inventors:
• **Duurland, Franciscus W.J.**
3632 AL Loenen a/d Vecht (NL)

(54) **Heat set, flour based products**

(57) Heat set, flour based products with excellent taste and performance are obtained by providing a flour based, heat set product with a layer, containing a fat, having:

35 - 80 % SUS-triglycerides
< 5 % S₃¹ - triglycerides
7 - 60 % (U₂S + U₃) - triglycerides

SUS
SSU

weight ratio < 6

S = Saturated fatty acid 16-18 C-atoms

S¹ = Saturated fatty acid 10-24 C-atoms

U = Unsaturated fatty acid 16-22 C-atoms

EP 0 728 415 A1

Description

Heat set, flour based products, such as cakes, puff-pastries, croissants, buns, rolls, bread, pan-cakes, etc. are well known. In order to improve the appearance and the taste of these products, these products often are provided with a layer, based on fat, either at the outside as a complete or partial coating or decorating layer, or at the inside as a filling or as a layer that separates two or more layers of the heat set, flour based products, or both simultaneously.

So far coating layers were often based on chocolate compositions, meaning that either cocoa butter or a cocoa butter equivalent were present as the fat component. Alternatively products from the prior art are based on soft bakery fats, such as biscuitine ®, which fats contain hardened vegetable oils, such as palm oil, rapeseed oil or soybean oil, in general mixed with liquid oils or lauric fats, such as coconut oil.

The layer that is used as a filling or as a layer between two layers of the heat set products, are often based on dairy fats or on lauric fats.

Although the use of these fats often results in products with acceptable appearance and mouthfeel, we now found products with an appearance and mouthfeel that are superior over above prior art products. These improvements are due to a new and better consistency of the coating or decorating layers, which results from the steep N-line of the fats applied. Our new products therefore display a firmer initial bite, while thereafter they melt quickly with a cooling effect. No waxy or fatty after taste or mouthfeel is observed.

The fat that we apply for the preparation of the products according to the invention is a fat that is disclosed in our prepublished EP 555 917.

However according to the specification of above document the fat is applied for the preparation of cool-melting, non-trans, non temper filling fats for confectionery products. Nothing is disclosed about the application of these fats in heat set, flour based products, let it be about the unexpected improvement that is obtained by its use.

Therefore our invention concerns the use of these fats in decorating layers or in coating layers of heat set, flour based products.

With heat set, flour based products are meant products made from a batter or a dough, in general after moulding of the batter or dough, wherein the main component of the batter or dough is a flour.

The heat setting can be achieved by a heat-treatment, in particular during the development of steam in the products, by baking, frying, boiling or any other method known in the bakery or in the culinary art.

So our invention concerns heat-set-flour-based products, provided with at least one layer of material, containing a fat, wherein the fat is a cool melting, non-trans, non-temper confectionery fat having:

35-80 wt% of SUS-triglycerides

< 5 wt% of S₃¹-triglycerides

7-60 wt% of (U₂S + U₃)-triglycerides

<40 wt% of SSU-triglycerides

$\frac{\text{SUS}}{\text{SSU}}$ - weight ratio < 6

S = saturated fatty acid having 16-18 C-atoms S¹ = saturated fatty acid having 10-24 C-atoms U = unsaturated fatty acid having 16-22 C-atoms

In above fat component the SUS level preferably is 51-80 wt%, most preferably 55-70 wt%.

Although the fat can be derived from different vegetable sources, we prefer to apply a fat, derived from palm, in particular from palm oil.

In the fats that we prefer at most at least 35 wt%, in particular at least 45 wt% of C_{16:0} and less than 8 wt%, preferably less than 6.5 wt% of C_{18:0} are present.

The best fats display a solid fat index, measured by NMR-pulse on non-stabilised fat of more than 20, in particular more than 40 at 20°C.

As heat set, flour based products can be used, heat set, moulded products, obtained from doughs or batters, having a composition of: flour, and on flour

0-100 wt% of a fat

0-180 wt% of a sugar

0-100 wt% of egg

0-400 wt% of milk product

0-200 wt% of water

0- 10 wt% of yeast or chemical leavener

0- 50 wt% of flavours and/or colorants

with the prerequisite that at least one of the components other than flour is present.

Specific examples of heat set products are heat set cake batters, heat set sponge batters, heat set bread or bun doughs, heat set puff pastry doughs, heat set moulded batters, heat set muffin batters, heat set doughnuts, etc. Each of above products have their own typical dough or batter composition. Heat set cake batter will contain: flour, and on flour

50- 90 wt% of fat
50-150 wt% of a sugar
50-100 wt% of egg
5- 40 wt% of milk

In heat set sponge batters the batter will contain: flour, and on flour

1- 20 wt% of an oil
50-150 wt% of a sugar
50-100 wt% of egg

For heat set bread or bun doughs the dough will contain: flour, and on flour:

1 -20 wt% of sugar
0.5-10 wt% of egg
0.5-10 wt% of leavener
40 -70 wt% of water

Heat set puff pastries are obtained after moulding and laminating a puff pastry dough with the composition: flour, and on flour

50-100 wt% of fat
30- 60 wt% of water

Even moulded batters, made from a batter containing flour and on flour: 5-150 wt% of milk product and 10-60 wt% of egg, can be used for the preparation of the heat set products.

The layer of material, which forms the coating or decoration layer containing the fat, can be a blend, comprising the fat, a sugar and one or more emulsifiers. As sugar any sugar, such as glucose, fructose, sucrose, maltodextrin, etc. could be applied.

As emulsifier any emulsifier known as useful in heat set, flour based products can be used. Examples thereof are: monoglycerides, in particular having high levels of saturated monoglycerides (Iodine value less than 10); DATA-esters (diacetyl tartaric esters of fatty acid), lecithin etc.

In above mixes for the layer, containing the fat, the fat can be present in amounts of 20-60 wt% and the sugar can be present in amounts of 20-80 wt%. The remaining part can consist of e.g. milk powder or cocoa mass.

The products that are part of the invention can be provided with a layer of material, containing the fat, which layer can be present as a layer fully or partially coating the outside of the product. However it is also possible to make products, wherein one or more layers of material, containing the fat are present either as coating-layer or as an intermediate layer between at least two parts of the heat-set products or as a combination thereof.

The composition, used for the preparation of the coating or decorating layer, containing the fat can also contain ingredients, like cocoa mass and/or milk powder (both full milk and skimmed milk). The presence of these components will give our layer the appearance of a chocolate- or a chocolate like layer.

The improvement in appearance and mouthfeel, which is observed in our products, is the most pronounced, when we apply our fats in fat continuous system for our coating or decorating layers.

EXAMPLES

1. Preparation of fat containing composition

The following recipe was applied:

- fat blend 45.5 wt%

- dextrose 18.2 wt%
- icing sugar 36.3 wt%
- lecithin 0.5 wt%
- flavour trace

Total fat content: 45.5 wt%

As fat blend a fat was used, having 2.2% S_3 ; 67.7% SUS; 13.7% SSU; 17.9% ($U_2S + U_3$); SUS : SSU = 4.9; $C_{16:0}$ = 51.1 and $C_{18:0}$ = 6.1.

The composition was made by mixing of the components in a Hobart mixer at 30°C.

2. Preparation of a cake

A cake batter was prepared in the conventional way from 1000 g. flour, 800 g. fat, 1000 g. sugar, 800 g. egg and 200 ml. milk.

The batter was transferred to a cake mould and baked for 45-60 min. at 180°C.

After cooling of the baked cake, the cake was provided with a decorating layer, made from the mix of example 1 by piping this mix on the top of the cake at 30°C.

3. Preparation of a Berliner bol

A batter for a Berliner bol was prepared from: 1000 g. patent flour, 50 g. sugar, 100 g. egg, 100 g. yeast, 20 g. salt; 50 g. full milk powder; 150 g. butter and 480 g. water.

The batter was made in a Hobart mixer. The batter was fermented for about 45 min. at 30°C.

50 g. of the batter was moulded in the shape of a ball and fried in a frying oil at 200°C until ready.

After cooling to ambient temperature the bol obtained was filled with the mix of example 1 at 30°C.

4. Preparation of other fat-containing compositions

4.1 The following recipes were applied:

	I	II	III	IV
Fatblend	33	21.7	40	13
Sugar	48	-	45	60
Dextrose	12	-	-	-
Skim milk powd.	7	-	-	-
Lecithin	0.4	-	0.4	-
Fondant	-	78.3	-	-
Monoglyceride	-	1	-	-
Full cream milk powd.	-	-	15	-
Butter (18% H_2O)	-	-	-	27

In recipes I and II the fat had the following triglyceride composition: 65.3 wt %SUS; 2.0 % S_3 ; 20.5 % ($U_2S + U_3$); 12.3 % SSU; (weight-ratio SUS : SSU = 5.3).

In recipe III the fat had the following triglyceride composition: 58.0 wt % SUS; 1.7 % S_3 ; 29.6 % ($U_2S + U_3$); 10.7 % SSU; (weight-ratio SUS : SSU = 5.4).

In recipe IV the fat had the following triglyceride composition: 70.1 wt % SUS; 2.2 % S_3 ; 14.4 % ($U_2S + U_3$); 13.3 wt % SSU; (weight-ratio: SUS : SSU = 5.3).

In comparative compositions the fat in recipes III and IV was replaced by a prior art fat with: 26.7 wt % saturated fatty acids; 45.8 wt % mono-unsaturated fatty acids and 27.5 wt % trans-fatty acids.

4.2 Cakes were made according to example 2. Some of these cakes were coated with a layer of compositions I or II by dipping of the cake into the liquified compositions I or II. The layer thickness of the coating was about 1 mm. The coated cakes displayed excellent properties, such as texture, cool melting, flavour release, cutability, adherence of coating to cake.

4.3 A number of other cakes were cut into two equal pieces. Compositions III or IV were mixed and aerated (overrun about 40 %). The cake-layers were provided with a layer of the aerated-compositions (layer thickness about 5 mm), while each cake-layer / aerated layer-composite was provided with another cake-layer on top of the aerated layer. The

cakes so obtained displayed excellent properties, which were far better than when applying the comparative compositions. In particular texture, coolmelting and flavour release properties were improved.

4.4 A number of the cakes obtained according to 4.3 above were dipped in a liquified composition according to recipes I or II (layerthickness about 2 mm). The resulting products according to the invention displayed unique properties, in particular with respect to texture, coolmelting, flavour release, cutability and adherence to cake.

Claims

1. Heat-set-flour-based products, provided with at least one layer of material, containing a fat, wherein the fat is a cool melting, non-trans, non-temper confectionery fat having:

35-80 wt% of SUS-triglycerides

< 5 wt% of S_3^1 -triglycerides

7-60 wt% of ($U_2S + U_3$)-triglycerides

<40 wt% of SSU-triglycerides

$\frac{SUS}{SSU}$ - weight ratio < 6

S = saturated fatty acid having 16-18 C-atoms

S¹ = saturated fatty acid having 10-24 C-atoms

U = unsaturated fatty acid having 16-22 C-atoms

2. Products, according to Claim 1, wherein the fat has a SUS-content of 51-80 wt%, preferably 55-70 wt%.
3. Products, according to Claim 2, wherein the SUS component is derived from palm fat.
4. Products, according to Claims 1 - 3, wherein the fat contains at least 35 wt%, preferably at least 45 wt% of $C_{16:0}$ and less than 8 wt%, preferably less than 6.5 wt% of $C_{18:0}$.
5. Products, according to Claims 1 - 4, wherein the fat displays an N_{20} (non-stab.) > 20, preferably > 40.
6. Products, according to Claims 1 - 5, wherein the heat-set, flour based products are heat-set, moulded products obtained from doughs or batters, having a composition of: flour, and on flour

0-100 wt% of a fat

0-180 wt% of a sugar

0-100 wt% of egg

0-400 wt% of milk product

0-200 wt% of water

0- 10 wt% of yeast or chemical leavener

0- 50 wt% of flavours and/or colorants

with the prerequisite that at least one of the components other than flour is present.

7. Products, according to Claim 7, wherein the heat-set flour based products are heat-set cake batters, containing:

flour, and on flour

50- 90 wt% of fat

50-150 wt% of a sugar

50-100 wt% of egg

5- 40 wt% of milk

8. Products, according to Claim 7, wherein the heat-set, flour based products are heat-set sponge batters, containing:

flour, and on flour

1- 20 wt% of an oil
50-150 wt% of a sugar
50-100 wt% of egg

- 5 9. Products, according to Claim 7, wherein the heat-set, flour based products are heat set bread doughs, containing:

flour, and on flour:
1 -20 wt% of sugar
0.5-10 wt% of egg
10 0.5-10 wt% of leavener
40 -70 wt% of water
10. Products, according to Claim 7, wherein the heat-set flour based products are heat-set puff-pastry doughs, containing:
15 flour, and on flour
50-100 wt% of fat
30- 60 wt% of water
- 20 11. Products, according to Claim 7, wherein the heat-set, flour based products are heat-set moulded batters, containing:

flour, and on flour
5-150 wt% of milk-product
25 10- 60 wt% of egg
12. Products, according to Claims 1 - 11, wherein the layer of material, containing the fat is a blend comprising the fat, sugar and emulsifier(s).
- 30 13. Products, according to Claim 12, wherein the layer of material, containing the fat, has a fat content of 20-60 wt% and a sugar-content of 20-80 wt%.
14. Products, according to Claims 1 - 13, wherein the layer of material, containing the fat is present as a layer fully or partially coating the outside of the product.
35
15. Products, according to Claims 1 - 13, wherein one or more layers of material, containing the fat are present either as coating-layer or as an intermediate layer between at least two parts of the heat-set products or as a combination thereof.
- 40 16. Products, according to Claims 1 - 13, wherein the layer of material, containing the fat is a chocolate or chocolate-like layer.
17. Products, according to Claims 1 - 13, wherein the layer of material, containing the fat is a layer of a fat-emulsion, preferably being a fat-continuous fat-emulsion.
45
18. Products, according to Claims 1 - 13, wherein the layer(s) of material, containing the fat is (are) present as continuous or discontinuous decorating layer(s).

50

55



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 20 0367

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D, Y	EP-A-0 555 917 (UNILEVER N.V.) * the whole document *	1-18	A2102/16 A21D13/00 A21D13/08 A21D10/00
Y	WO-A-94 19953 (LODERS CROKLAAN B.V.) * claims; examples *	1-18	
A	WO-A-94 16572 (UNILEVER N.V.) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A21D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 June 1996	Examiner Bevan, S
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1501 01.92 (P/0401)

FLEXIBLE ICE-CREAM COATING COMPOSITIONS

Patent number: EP0783250
Publication date: 1997-07-16
Inventor: CAIN FREDERICK WILLIAM (NL); MANSON HELGA (NL); VAN STRAALEN JEROEN (NL)
Applicant: LODERS CROKLAAN BV (NL)
Classification:
- international: **A23D9/00; A23D9/00;** (IPC1-7): A23D9/00; A23G9/02
- european:
Application number: EP19950934103 19950922
Priority number(s): EP19950934103 19950922; WO1995EP03748 19950922; EP19940202833 19940930

Also published as:

 EP0783250 (A3)
 EP0783250 (B2)
 EP0783250 (B1)

Report a data error here

Abstract not available for EP0783250

Data supplied from the **esp@cenet** database - Worldwide



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A23D 9/00, A23G 9/02	A2	(11) International Publication Number: WO 96/10338 (43) International Publication Date: 11 April 1996 (11.04.96)
(21) International Application Number: PCT/EP95/03748 (22) International Filing Date: 22 September 1995 (22.09.95) (30) Priority Data: 94202833.3 30 September 1994 (30.09.94) EP (34) Countries for which the regional or international application was filed: NL et al. (71) Applicant (for all designated States except US): LODERS CROKLAAN B.V. [NL/NL]; Zandijkerweg 36, NL-1521 AX Wormerveer (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): CAIN, Frederick, William [GB/NL]; Dr. Blookerstraat 12, NL-2271 VL Voorburg (NL). MANSON, Helga [NL/NL]; Colorado 4, NL-1186 HX Amstelveen (NL). VAN STRAALLEN, Jeroen [NL/NL]; Kerkstraat 94, NL-1687 AT Wognum (NL).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG). Published <i>Without international search report and to be republished upon receipt of that report.</i>
(54) Title: FLEXIBLE ICE-CREAM COATING COMPOSITIONS (57) Abstract Flexible ice-cream coating compositions are obtained by using as fat for the fatphase a triglyceride-composition, comprising: < 8 wt.% of SSS; 25 - 80 wt.% of SUS; 2 - 40 wt.% of SU ₂ ; > 5 wt.% of U ₃ ; S = saturated fatty acid C ₁₆ -C ₂₄ ; U = unsaturated fatty acid C ₁₈ +.		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

Flexible ice-cream coating compositions

Conventional ice-cream coatings are based on lauric fats. Preferred lauric fats applied for this purpose are coconut oil and palm kernel oil or fractions thereof. However, such fats have drawbacks when applied in ice-cream coatings. Apart from the fact that the SAFA-level, ie. the total of saturated fatty acids and trans-unsaturated fatty acids is very high (90-100%), it was also found that the use of these fats in ice-cream coatings led to products that were brittle. Therefore these products are difficult to process and must be handled with care upon transportation, for else the coatings will crack.

A solution for this problem was found in the development of so called "flexible ice-cream coatings". An example of a flexible ice-cream fat composition is disclosed in EP 502,697. According to this disclosure the composition should contain a fat phase that comprises 10-85 wt% of S_2U -triglycerides and 15 - 90 wt% of SU_2 -triglycerides, while at least 35 wt% S_2U consists of S_2Ln ($Ln = C_{18:2}$). According to the specification fats, wherein the S_2Ln mainly consists of $SSLn$ are useful for frozen desserts. In the examples 16, 17 and 18 different applications of these fats are illustrated; ie. in ice-cream-in-sugar corn cups; as cub-like chocolates in ice-cream and as ice-cream bars, containing a chocolate centre. However, no application of these fats in ice-cream coatings or as coating of an ice-cream cone is given. Moreover, the use of fats high in $SSLn$ means that no natural fats can be applied, as no natural fat is known that is high in $SSLn$. Therefore these fats must be synthesized.

We have studied, whether we could find fats, that when applied in ice-cream coating compositions would display at least a similar flexibility as the above known fats,

however the fats should be derivable from natural fats.

Moreover the fats should, when applied in ice-cream coating compositions lead to compositions with a viscosity at the
 5 temperature of its use, which enables it to spray them on the inside of a (ice-cream) cone, without sticking to the top of the cone and/or without running through the cone and collecting as a liquid mass at the bottom of the cone.

10 For this purpose so far partially hardened rapeseed oil was often used. This fat however is rich in trans fatty acids and is therefore considered as unhealthy.

Therefore our invention concerns flexible ice-cream coating
 15 composition, comprising at least a sugar and a triglyceride-composition, wherein the triglyceride composition comprises:

20	< 8 wt%, preferably < 5wt%, most preferably < 2wt% of SSS; 25 - 80 wt%, preferably 35 - 75 wt% of SUS; 2 - 40 wt%, preferably 5 - 20 wt% of SU₂; > 5 wt%, preferably > 10 wt%, most preferably 15 - 45 wt% of U₃,
----	---

25

wherein S and U are fatty acid residues in the triglycerides,
 S being saturated fatty acid with C₁₆ - C₂₄
 U being unsaturated fatty acid with ≥ 18 C-
 30 atoms.

30

Although S can be a saturated fatty acid with 16-24 C-atoms, we prefer S to have 16 - 18 atoms. The most preferred are the fats that have a C_{16:0} : C_{18:0} weight ratio
 35 of 0.4 to 9.0, preferably 0.8 to 3.0. In particular the fats having an StOst-content of the SUS-component of at

least 20 wt%, preferably at least 25 wt%, most preferably 30-50 wt% are applied.

U in above definition can be any mono- or polyunsaturated fatty acid with at least 18 C-atoms. This thus includes both cis and trans unsaturated fatty acids. However we prefer to use the cis-isomers, as those are considered to be healthier than the trans isomers. A particular preference exists for fats, wherein U comprises $C_{18:1}$ and $C_{18:2}$, while the weight-ratio SOS : SLnS ($O = C_{18:1}$; $Ln = C_{18:2}$) in the triglyceride part is more than 3.0, preferably more than 6.0.

Very suitable ice-cream coatings are obtained, when the triglycerides-part of the composition displays a solid fat index (NMR-pulse: not stabilized) at the temperature indicated of:

$N_0 > 35$, preferably 40 - 80
 $N_{20} > 5$, preferably > 10 ; most preferably 15 - 60
 $N_{25} = 0 - 35$, preferably 2 - 20

Another advantage of our invention is, that it enables us to apply fats with high contents of unsaturated fatty acids. Therefore we prefer to use fat compositions that have a content of cis-unsaturated fatty acids of more than 20 wt%, preferably more than 30 wt%, in particular 50 - 80 wt%.

Our triglyceride-compositions can be made by synthetic routes e.g. by chemical or enzymic (inter) esterification of appropriate starting materials. Examples thereof being : glycerol, monoglycerides, diglycerides and triglycerides, which can be converted with the appropriate fatty acids, fatty acid esters, anhydrides or other triglycerides. However, a far more convenient route for the preparation is

by using natural fats or fractions thereof. Therefore we prefer flexible ice-cream coating compositions wherein the triglyceride-part is a blend of natural fats A and B or fractions thereof, wherein fat A has a SUS-level of more
5 than 35 wt%, preferably more than 70 wt%, while fat B is a liquid fat with an $N_{20} < 5$, that contains preferably more than 30 wt% of $(U_2S + U_3)$ - triglycerides, while the ratio of $U_3 : U_2S$ is > 1.0 . In above compositions the weight ratio for fats A and B suitably ranges from 80 : 20 to 40 : 60.

10

Although a wide range of fats A and B can be applied, we prefer to use a fat A that is derived from palm oil, shea, illipe, cocoa butter or fractions thereof while fat B preferably is selected from the group, consisting of
15 sunflower-oil, high oleic sunflower oil, maize oil, soybean oil, olive oil, safflower oil, canola oils.

The most preferred fats A are natural fats or fractions thereof, that have a $C_{16:0}$ -content of more than 15 wt%,
20 preferably 25 - 75 wt%.

Part of our invention are also flexible ice-cream coating compositions, that comprise :

- 25 25 - 60 wt% of a sugar
- 20 - 70 wt% of the triglyceride-composition as defined above
- 0 - 30 wt% of at least one of the components from the group consisting of : cocoa powder, milk protein, lactose, emulsifier, one or more
30 flavours, such as: strawberry, lemon, raspberry, yoghurt, etc.

The coated ice-creams, which are obtained after coating the ice-cream with the fats described above, e.g. by dipping
35 are also part of the invention.

Further ice-creams in a cone, wherein the cone is coated with the compositions according to the invention are also part of the invention.

5 Examples

1.1. The following recipe was applied :

	wt%
sugar	42.7
fat	38.1
10 cocoa powder N/11/N	12.5
skim milk powder	6.2
lecithin	0.5

The following fats were applied:

- 15 A: coconut oil (= reference)
 B: cocoa butter (= reference)
 C: a mixture of cocoa butter equivalent and liquid oil (45 : 55).

The triglyceride-compositions of fat C was :

	<u>SSS</u>	<u>SUS</u>	<u>SU₂</u>	<u>U₃</u>
20 wt%	0.9	41	15	43

Its C_{16:0} / C_{18:0} weight-ratio was: 1.1

- 25 1.2. The coatings were made by mixing the ingredients, refining the blend on a 3-roll refiner and conching. The compositions were kept at about 40°C and ice-creams were dipped into the compositions.

- 30 1.3. Dripping time, drying time, weight % coating on product and flexibility of the coating were evaluated. The results are given below

<u>Coating fat</u>	<u>Coat T °C</u>	<u>Flexibility</u>	<u>Drip time (sec)</u>	<u>dry-time (sec)</u>	<u>weight %</u>
A	40	2 - 3	16	42	21
B	40	3	20	119	30
C	40	4-5	21	198	31

Flexibility is given on a scale 0 - 5

1 = not flexible

5 = very flexible

1.4. From above results it can be concluded that our new compositions, based on fat C provide the best flexible coatings. Drip-times are about similar. The weight % coating on product is similar, except for fat A, where it is low. Dry-times are longer for fat C and shortest for fat A.

Example 2

Example 1 was repeated, however, applying the following recipe:

Sugar:	25.8
Fat:	59.2
Cocoa powder N/11/N:	13.0
Skim milk powder:	1.7
Lecithin:	0.3

The following fats D, E, F and G were applied.

Fat D = 80% cocoa butter equivalent; 20% palm oil olein

Fat E = 60% cocoa butter equivalent; 40% palm oil olein

Fat F = 80% cocoa butter equivalent; 20% sunflower oil

7

Fat G = 80% cocoa butter equivalent; 20% soybean oil
The triglyceride-composition of this fat was:

	Fat	S ₃	SUS	SU ₂	U ₃	C ₁₆ :C ₁₈ - sat
5	D	2.5	71.1	15.8	1.3	8.3
	E	2.1	59.1	27.9	2.3	8.6
	F	2.3	67.3	6.8	16.1	7.1
	G	2.3	68.0	10.0	11.3	7.5

10

The evaluation of the results led to the following.

	Fat in coating	Temp°C	flexibility	driptime (sec)	dry- time (sec)	% weight
15	D	40	2	8	76	16
	E	40	3	8	93	15
	F	40	4 - 5	8	67	16
	G	40	4 - 5	7	58	15

20 So the coatings according to our invention (F and G)
displayed the best flexibility, while also the dry-times
were the shortest.

Example 3

3.1 Coating compositions were made, using the following recipe:

5		wt%
	Fat	44.8
	Sugar	42.6
	Cocoa powder N11N	12.0
	Lecithin	0.5

10

The following fats were applied

Fat H = partially hardened rapeseed oil, m.pt.
32 °C.

Fat I = coconut oil

15 Fat J = 80% cocoa butter eq / 20% sunflower oil

Fat K = 80% coconut oil topfraction / 20%
sunflower oil

Fat L = high oleic sunflower oil

20 3.2 The compositions were sprayed into standard sleeved
Cornetto cones, using a De Vilbiss - air atomising
gun. The temperatures of spraying varied with the fat
and were inside the range of 28 - 40 °C, so that the
viscosity of the compositions were similar. The
25 weight-increase of the cones varied from 0.1 - 0.3 g.
in all cases.

3.3 Ice-cream was dosed into the sprayed cones. Cardboard
lids were placed in the sleeves and the products were
30 cooled to -20 °C during 24 hrs. The products were
store at -10 °C.

3.4 The different products were evaluated on its crispness
by tactile and oral assessment. The keepability is

taken as the day in which the average crispness score of five cones has decreased to "Borderline / Unacceptable". The results were as follows:

	<u>Fat</u>	<u>Keepability</u> (days at -10 °C)
5	H	32
	I	24
	J	30
	K	24
	L	10
10	So our fat J led to results comparable with the commercial fat H (being high in trans) and far better than other (non-trans) fats.	

CLAIMS

1. Flexible ice-cream coating composition, comprising at least a sugar and a triglyceride-composition, wherein the triglyceride composition comprises:

< 8 wt%,	preferably < 5wt%, most preferably < 2wt% of SSS;
25 - 80 wt%,	preferably 35 - 75 wt% of SUS;
2 - 40 wt%,	preferably 5 - 20 wt% of SU ₂ ;
> 5 wt%,	preferably > 10 wt%, most preferably 15 - 45 wt% of U ₃ ,

wherein S and U are fatty acid residues in the triglycerides,
 S being saturated fatty acid with C₁₆ - C₂₄
 U being unsaturated fatty acid with ≥ 18 C-atoms.

2. Flexible ice-cream coating composition according to claim 1, wherein S = saturated fatty acid with 16 - 18 C-atoms, while the ratio C_{16:0} : C_{18:0} in the triglyceride part of the composition ranges from 0.4 to 9.0.
3. Flexible ice-cream coating compositions according to claims 1 and 2, wherein U comprises C_{18:1} and C_{18:2}, while the weight-ratio SOS : SLnS (O = C_{18:1}; Ln = C_{18:2}) in the triglyceride part is more than 3.0, preferably more than 6.0.
4. Flexible ice-cream coating composition according to claims 1 - 3, wherein the triglyceride part displays a solid fat index (NMR-pulse: not stabilized) at the temperature indicated of:

$N_0 > 35$, preferably 40 - 80
 $N_{20} > 5$, preferably 15 - 60
 $N_{25} = 0 - 35$, preferably 2 - 20

5. Flexible ice-cream coating composition according to claims 1 - 4, wherein the fatphase of the composition has a content of cis-unsaturated fatty acids of more than 20 wt%, preferably more than 30 wt%, in particular 50 - 80 wt%.
6. Flexible ice-cream coating composition according to claims 1 - 5, wherein the triglyceride-part is a blend of natural fats A and B or fractions thereof, wherein fat A has a SUS-level of more than 35 wt%, preferably more than 70 wt%, while fat B is a liquid fat with an $N_{20} < 5$, that contains preferably more than 30 wt% of $(U_2S + U_3)$ - triglycerides, preferably having a weight-ratio $U_3 : U_2S$ of more than 1.0.
7. Flexible ice-cream coating composition according to claim 6, wherein the weight-ratio for fats A and B (so A : B) ranges from 80 : 20 to 40 : 60.
8. Flexible ice-cream coating composition according to claims 6 - 7, wherein fat A is derived from palm oil, shea, illipe, cocoa butter or fractions thereof and fat B is selected from the group consisting of sunflower oil, maize oil, soybean oil, olive oil, safflower oil, high oleic sunflower and canola oils.
9. Flexible ice-cream coating composition according to claim 6 - 8, wherein fat A is a natural fat or fraction thereof with a $C_{16:0}$ - content of more than 15 wt%, preferably 25 - 75 wt%.

Flexible ice-cream coating composition according to claims 1 - 9, comprising :

25 - 60 wt% of a sugar

20 - 70 wt% of the triglyceride-composition as defined in claim 1

0 - 30 wt% of at least one of the components from the group consisting of : cocoa powder, milk protein, lactose, emulsifier and one or more flavours.

Coated ice-cream, wherein the ice-cream is coated with the composition according to claims 1 - 10.

Ice-creams in a coated cone, wherein the cone is coated with the composition according to claims 1 - 10.

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A61K 47/00, A23D 7/00		A1	(11) International Publication Number: WO 96/31240
			(43) International Publication Date: 10 October 1996 (10.10.96)
(21) International Application Number: PCT/US96/04588 (22) International Filing Date: 2 April 1996 (02.04.96) (30) Priority Data: 08/418,641 7 April 1995 (07.04.95) US (71) Applicant: BRANDEIS UNIVERSITY [US/US]; South Street, Waltham, MA 02254-9110 (US). (72) Inventors: SUNDRAM, Kalyana; 32, Lorong SS1, 11A, Kampung Tunku, 47300 Petaling Jaya, Selangor DE (MY). PERLMAN, Daniel; 94 Oakland Avenue, Arlington, MA 02173 (US). HAYES, Kenneth, C.; 68 Washburn Avenue, Wellesley, MA 02181 (US). (74) Agents: WARBURG, Richard, J. et al.; Lyon & Lyon, First Interstate World Center, Suite 4700, 633 West Fifth Street, Los Angeles, CA 90071-2066 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>	
(54) Title: INCREASING THE HDL LEVEL AND THE HDL/LDL RATIO IN HUMAN SERUM BY BALANCING SATURATED AND POLYUNSATURATED DIETARY FATTY ACIDS			
(57) Abstract A method of increasing the HDL concentration and the HDL/LDL concentration ratio in human serum by providing a balance between a sufficient and required proportion of cholesterol-free saturated fatty acids in the daily dietary fat of the human and a sufficient and required, but not excessive, proportion of polyunsaturated fatty acids comprising linoleic acid in dietary fat, while the remaining proportion of fatty acids and energy from the dietary fat is provided by monounsaturated fatty acids comprising oleic acid. The saturated fatty acids must constitute between 20 % and 40 % by weight of the daily dietary fat based upon dietary fat accounting for 30 % of the total dietary energy consumption, and linoleic acid must constitute between 15 % and 40 % by weight of dietary fat. In this way, the required proportional intake of polyunsaturated fatty acids enhances the formation of HDL from VLDL and/or decreases the clearance of HDL, while an excessive proportional intake of polyunsaturated fatty acids and monounsaturated fatty acids is avoided to assure a sufficient dietary availability of saturated fatty acids which are required for sufficient VLDL synthesis and HDL production.			

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgyzstan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	KZ	Kazakhstan	SG	Singapore
CH	Switzerland	LJ	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovakia
CM	Cameroon	LR	Liberia	SN	Senegal
CN	China	LT	Lithuania	SZ	Swaziland
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	LV	Latvia	TG	Togo
DE	Germany	MC	Monaco	TJ	Tajikistan
DK	Denmark	MD	Republic of Moldova	TT	Trinidad and Tobago
EE	Estonia	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	UG	Uganda
FI	Finland	MN	Mongolia	US	United States of America
FR	France	MR	Mauritania	UZ	Uzbekistan
GA	Gabon			VN	Viet Nam

DESCRIPTION

INCREASING THE HDL LEVEL AND THE HDL/LDL RATIO
IN HUMAN SERUM BY BALANCING SATURATED AND
POLYUNSATURATED DIETARY FATTY ACIDS

Background of the Invention

5

This invention relates to fats and fat blends, and methods for their manufacture or genetic selection/engineering, and use in foods to stabilize or lower
10 the low density lipoprotein cholesterol (LDL or LDL-C) concentration and increase the high density lipoprotein cholesterol (HDL or HDL-C) concentration in human serum.

Coronary heart disease (CHD) is the major cause of death in the USA and other affluent nations. Plasma cholesterol,
15 more specifically the LDL/HDL ratio, is highly correlated with risk of CHD as documented by Willett and Sacks, 324 N.Eng.J. Med. 121, 1991. The accumulation of LDL in the arterial intima is thought to lead to its oxidation, which in turn results in cascading events that induce arterial
20 occlusion and thrombosis. High concentrations of HDL appear to block LDL oxidation and reduce the atherogenic potential

of LDL. Thus, dietary means which decrease the LDL/HDL ratio (or increase the HDL/LDL ratio), especially means which would increase HDL, are desirable. Perlman and Hayes, U.S. Pat. No. 5,382,442 describe modified fat
5 compositions and methods for decreasing total serum cholesterol while simultaneously decreasing the LDL/HDL serum cholesterol ratio. This ratio decreased as both the LDL and HDL concentrations decreased. The net LDL/HDL ratio in the serum decreased only because the LDL
10 cholesterol concentration decreased by a greater factor than serum HDL with the dietary use of a fat-oil blend which included one to ten parts by weight cholesterol-reduced animal fat containing myristic acid, and one part by weight vegetable oil containing linoleic acid.

15 Within the past three years several authors have collected and analyzed a large number of independent metabolic studies relating to the effect of saturated, monounsaturated, and polyunsaturated fatty acids in the diet on serum LDL and HDL cholesterol levels. These
20 studies have included the techniques of multiple regression analysis to examine LDL and HDL levels versus dietary intake of each group of fatty acids as separate variables expressed as the percentage of dietary energy, i.e., the total daily calorie intake of individuals in the
25 studies.

Mensink and Katan (12 Arteriosclerosis and Thrombosis 911, 1992) made the following conclusions; "Replacement of saturated by unsaturated fatty acids raised the HDL to

LDL cholesterol ratio, whereas replacement by carbohydrates had no effect. Thus, under isocaloric metabolic-ward conditions the most favorable lipoprotein risk profile for coronary heart disease was achieved if
5 saturated fatty acids were replaced with unsaturated fatty acids, with no decrease in total fat intake." Hegsted et al. (57 Am. J. Clin. Nutr. 875, 1993), combined data from 155 human trials in which LDL and HDL cholesterol measurements were available. With regard to fatty acids
10 and cholesterol in the diet, the authors state in their published abstract, "1) saturated fatty acids increase and are the primary determinants of serum cholesterol, 2) polyunsaturated fatty acids actively lower serum cholesterol, 3) monounsaturated fatty acids have no
15 independent effect on serum cholesterol and 4) dietary cholesterol increases serum cholesterol and must be considered when the effects of fatty acids are evaluated. More limited data on low density lipoprotein cholesterol (LDL-C) show that changes in LDL-C roughly parallel the
20 changes in serum cholesterol but that changes in high density lipoprotein cholesterol cannot be satisfactorily predicted from available data." Within this cited article, Hegsted et al. show that LDL levels increase an average of 1.74 mg/dl for each 1% increase in dietary
25 energy represented by saturated fatty acids, while LDL levels decrease an average of 0.77 mg/dl for the corresponding amount of polyunsaturated fatty acids. Referring to the possibility of predicting changes in HDL levels in

the serum, these same authors state, "It does not appear possible to develop an equation that predicts changes in HDL-C satisfactorily" and, "The errors in the regression coefficients are large; hence, little reliance should be placed on the equation." These authors calculate a very modest increase in HDL-C correlating with a dietary increase in either saturated or polyunsaturated fatty acids (0.43 mg/dl for a 1% increase in dietary energy represented by saturated fatty acids and 0.22 mg/dl for the corresponding amount of polyunsaturated fatty acids). This indicates that one would expect that for saturated fatty acids, the much smaller increase in HDL (0.43) versus LDL (1.74) per 1% dietary energy, would typically result in a decrease in the HDL/LDL ratio as the saturated fatty acids are increased. On the other hand, the Hegsted et al. and the Mensink and Katan calculations would predict that an increase in the proportion of dietary polyunsaturated fatty acids at the expense of saturated fatty acids would increase the HDL/LDL ratio because this dietary increase caused a large decrease in LDL (approximately 2 mg/dl) and only a small proportional decrease in HDL (approximately 0.2 mg/dl). By comparison, the overall HDL/LDL serum ratios in these studies ranged from approximately 0.25 to 0.50.

Fat blends which include saturated vegetable fats in combination with polyunsaturated vegetable oils have been noted for dietary and/or cooking use. For example, Choi et al., [24(1) Lipids 45, 1989] describe cholesterol

synthesis in rats with the feeding of safflower oil or linseed oil blended with palm olein in purified diets containing 10% fat. Suzuki et al., (Jpn. Kokai Tokkyo Koho JP 01, 262,753 [89,262,753] 19 Oct 1989),
5 describe the use of 40-90% natural palm oil and 60-5% natural vegetable oil in deep frying. Lim et al., [39(12) Yukagaku 1045, 1990] describe the increased oxidative stability of soybean oil blended with crude or refined palm oil or refined palm kernel oil. Murakami et al.,
10 [41(3) Yukagaku 196, 1992] describe the feeding of soybean oil blended with an equal weight of palm stearin in diets containing 20% fat in which cholesterol metabolism was monitored in rats. Kajimoto et al., [44(6) Nippon Eiyo. Shokuryo Gakkaishi 499, 1991] describe the
15 blending of soybean oil or rapeseed oil with palm oil, and the blending of soybean oil, rapeseed oil and palm oil to enhance the oxidative stabilities of the polyunsaturated oils. Han et al., [23(4) Han' guk Sikip'um Kwahakhoechi 465, 1991] describe the stabilization of soybean oil
20 against thermal and oxidative degradation by blending with an equal or greater proportion of palm oil.

Summary of the Invention

Applicant has determined that in the consumption of dietary fat (as natural triglycerides) it is important to
25 maintain a specific ratio of saturated fatty acids to polyunsaturated fatty acids (at least 0.5:1 but less than 2:1) in the absence of cholesterol. Particularly, it is useful to ingest an adequate proportion of saturated fatty

acids contributed by a vegetable oil source such as palm oil, palm olein or its equivalent combined with polyunsaturated fatty acids contributed by a vegetable oil source such as canola oil or soybean oil. Thus, the present invention relates to the dietary use of a cholesterol-free composition in which a balanced proportion of at least one saturated fatty acid such as palmitic acid, myristic acid, and lauric acid is provided together with an approximately equal proportion of at least one polyunsaturated fatty acid such as linoleic acid in the dietary fat. This balanced proportion can be achieved with a mixture of two or more vegetable oils and/or vegetable fats. Alternatively, with recent advances in plant breeding and selection using conventional or genetic engineering methods, the ratio of saturated to polyunsaturated fatty acids provided by single plant species can be manipulated. Thus, in the near future, with suitable plant breeding and selection, a vegetable oil-bearing single plant species may provide, within the range described above, a balanced proportion of saturated and polyunsaturated fatty acids. Furthermore, such plant breeding can provide an enhanced level of alpha-linolenic acid in addition to linoleic acid. There are already a number of examples of successful plant breeding or varietal selection efforts which have led to commercial alternatives in choosing a particular vegetable oil. For example, with the species *Carthamus tinctorius* (safflower), varieties of oil are available with either

high oleic acid (>70%) or high linoleic acid (>70%). With the species *Helianthus annuus* (sunflower) varieties of oil are available with either medium (<60%) or high (<60%) levels of linoleic acid. Likewise, canola oil (rapeseed) is available from different varietal sources of two species (*Brassica napus* and *B. campestris*) with erucic acid (22:1) contents from zero to forty percent (see Baily's Industrial Oil and Fat Products, Vol. 1, D. Swern, ed., Wiley and Sons, New York). Such a composition will increase HDL cholesterol and increase the HDL/LDL ratio (or decrease the LDL/HDL ratio) in the serum of mammals including humans and other primates. According to the present invention, a method is described for increasing the HDL/LDL ratio in human serum in which the HDL concentration increases while the LDL concentration remains essentially constant or decreases. Accordingly, when daily injected fat in the human diet is provided at a level such that it accounts for approximately 30% of the total dietary energy (as currently recommended by the nutritional research community), the saturated fatty acids including palmitic acid, or lauric and myristic acid must constitute between 20% and 40% by weight of the daily dietary fat, and the polyunsaturated fatty acids including linoleic acid must constitute between 15% and 40% by weight of this fat to maximize the serum HDL/LDL ratio. As one example, a cholesterol-free natural triglyceride fat blend containing equal proportions of approximately 30% by weight palmitic acid and 30% by weight linoleic

acid plus linolenic acid is useful in the present invention. For this invention to be completely effective, it is important that certain cholesterolemic components be substantially absent from the diet. These components
5 include but are not limited to dietary cholesterol and trans fatty acids, e.g., triglycerides containing elaidic acid produced during partial hydrogenation of vegetable oils. Illustrating this point with a human nutritional study, Sundram et al. (9 FASEB J. 000, 1995, Abstr.) have
10 shown that exchanging trans 18:1 [elaidic acid] for cis 18:1 [oleic acid] caused a large increase in LDL and a decrease in HDL (where trans and cis 18:1 represented respectively, 7% and 16% of the dietary energy). This result and effect is opposite to the desired effect of the
15 present invention.

Applicant has determined that a moderate proportion of saturated fatty acids is beneficial for increasing the HDL/LDL ratio in human serum and that a large proportion of polyunsaturated fatty acids in the dietary fat may,
20 surprisingly, be undesirable in depressing this ratio.

Such advantages are achieved when the diet is essentially free of trans fats (e.g., elaidic) and represents the actual profile of fatty acid intake of the human.

25 Thus, in a first aspect, the invention features a method of increasing the HDL concentration and the HDL/LDL concentration ratio in human serum. This is achieved by providing a balance between a sufficient and required

proportion of cholesterol-free saturated fatty acids in the daily dietary fat of a human, and a sufficient and required, but not excessive proportion of polyunsaturated fatty acids including linoleic acid in dietary fat. The
5 remaining proportion of fatty acids and energy from dietary fat is provided by monounsaturated fatty acids including oleic acid. This means that the saturated fatty acids must constitute between 20% and 40% by weight of the daily dietary fat (based upon dietary fat accounting for
10 30% of the total dietary energy consumption). It also means that linoleic acid must constitute between 15% and 40% by weight of this dietary fat. These constituents will provide the required proportional intake of polyunsaturated fatty acids and thereby enhance the
15 formation of HDL from VLDL and/or decrease the clearance of HDL. An excessive proportional intake of polyunsaturated fatty acids and monounsaturated fatty acids is also avoided in such a formulation to assure a sufficient dietary availability of saturated fatty acids
20 which are required for sufficient VLDL synthesis and HDL production.

In preferred embodiments, the cholesterol-free saturated fatty acids include palmitic acid, lauric acid and myristic acid; the proportion of monounsaturated fatty
25 acids in the daily dietary fat is between 20% and 50% oleic acid and no greater than 1% elaidic acid (or other unnatural trans fatty acids) by weight; the polyunsaturated fatty acids include linoleic acid and at

least one other polyunsaturated fatty acid selected from the group including α -linolenic acid, eicosapentenoic acid (EPA), and docosahexenoic acid (DHA); and the proportion of saturated fatty acids in the daily dietary fat is at least 20% by weight and dietary fat has less than 5% by weight stearic acid.

In a second related aspect, the invention features a method of stabilizing or decreasing the LDL concentration in human serum by providing saturated fatty acids in the daily diet in a proportion between 20% and 40% by weight of the daily dietary fat (based upon dietary fat accounting for 30% of the total dietary energy consumption), and maintaining a proportion of polyunsaturated fatty acids (including linoleic acid) in the daily diet at the expense of monounsaturated fatty acids (including oleic acid and/or elaidic acid). The linoleic acid constitutes between 15% and 40% by weight of dietary fat. Removal of plasma VLDL remnants and LDL is maximized by this formulation, and the production of LDL is reduced.

In a third related aspect, the invention features a method of increasing the HDL and stabilizing or decreasing the LDL concentration in human serum by providing saturated fatty acids in the daily diet in a proportion between 20% and 40% by weight of the daily dietary fat (based upon dietary fat accounting for 30% of the total dietary energy consumption), whereby the production of VLDL, as the HDL precursor, is adequately sustained and is

not limiting in HDL biosynthesis. In addition, the method includes maintaining a proportion of polyunsaturated fatty acids (including linoleic acid) in the daily diet at the expense of monounsaturated fatty acids (including oleic acid and/or elaidic acid), wherein linoleic acid constitutes between 15% and 40% by weight of dietary fat, whereby VLDL catabolism to HDL is facilitated and hepatic clearance of VLDL remnants and LDL is enhanced.

10 In a fourth related aspect, the invention features a method of increasing the HDL concentration and the HDL/LDL concentration ratio in human serum by the dietary consumption of foods prepared using a cholesterol-free single fat composition or blended fat composition
15 containing a ratio of one part by weight polyunsaturated fatty acids to at least one part by weight saturated fatty acids. The single fat composition or blended fat composition includes linoleic acid and at least one saturated fatty acid selected from the group including
20 lauric acid, myristic acid, and palmitic acid. The linoleic acid constitutes between 15% by weight and 40% by weight of the composition and saturated fatty acid constitutes between 20% and 40% by weight of the composition. In this way, adequate dietary levels of
25 saturated fatty acids in the absence of cholesterol stimulate VLDL synthesis and secretion by the liver, and adequate dietary levels of linoleic acid enhance LPL activity and generation of HDL from VLDL while stimulating

the removal of VLDL remnants and LDL, and concomitantly decreasing CETP activity and HDL catabolism.

In preferred embodiments of the above aspects, the foodsource of saturated fatty acids includes at least one vegetable fat selected from the group including palm fat, coconut fat and cocoa butter; the palm fat is selected from the group including palm oil, palm olein, and palm kernel oil; the food source of polyunsaturated fatty acids includes at least one vegetable oil selected from the group including corn oil, sunflower oil, safflower oil, soybean oil, cottonseed oil, canola oil, and peanut oil; alternatively, the food source of both saturated fatty acids and polyunsaturated fatty acids is a single vegetable oil species which has been selected or engineered to provide the requisite balance of saturated and polyunsaturated fatty acids; the polyunsaturated fatty acids include linoleic acid and linolenic acid; wherein linolenic acid is contributed by soybean oil, canola oil, edible flax seed oil, and/or perrilla seed oil; within the single fat composition or blended fat composition is provided a proportion of at least one part by weight cholesterol-free saturated fat to one part by weight polyunsaturated fat to stabilize the polyunsaturated fat against oxidation; the oxidation-resistance of the single fat or blended fat composition upon heating to a temperature of 100°C or greater in air is increased by at least 25% compared to the oxidation resistance of the polyunsaturated fat component when heated separately from

the single fat or blended fat composition; essentially all of dietary fat is provided in a nutritionally balanced liquid and/or solid formula diet in which dietary fat accounts for between 15% and 45% of the total dietary energy consumption; the dietary fat accounts for between 20% and 30% of the total dietary energy consumption; the compositions noted above are used in place of dietary consumption of foods prepared using a blended fat composition, that is, such foods are substituted with the dietary consumption of a nutritionally balanced liquid formula diet prepared using a single fat or blended fat composition in which the total fat content therein accounts for between 15% and 45% of the total dietary energy consumption; daily dietary fat or foods contain a blended fat composition including one part by weight of at least one polyunsaturated vegetable oil selected from the group including corn oil, sunflower oil, safflower oil, soybean oil, cottonseed oil, canola oil, and peanut oil blended with at least one part by weight of vegetable fat including saturated fatty acids; the vegetable fat is selected from the group including palm fat, coconut fat and cocoa butter; and the palm fat is selected from the group including palm oil, palm olein, and palm kernel oil. Alternatively the daily dietary fat or foods contain a single vegetable oil species which has been selected or engineered to provide the requisite balance of saturated and polyunsaturated fatty acids.

In a fourth related aspect, the invention features a method of increasing the HDL concentration and the HDL/LDL concentration ratio in human serum by the dietary consumption of foods. These foods are prepared using at least one modified fat selected from the group including a chemically interesterified fat, an enzymatically interesterified fat, and a synthetic fat. The modified fat includes one part by weight polyunsaturated fatty acids and at least one part by weight saturated fatty acids selected from the group including lauric acid, myristic acid, and palmitic acid. The polyunsaturated fatty acids constitute between 15% by weight and 40% by weight of modified fat, and the saturated fatty acids constitute between 20% and 40% by weight of modified fat. In this way adequate dietary levels of saturated fatty acids in the absence of cholesterol stimulate VLDL synthesis and secretion by the liver, and adequate dietary levels of polyunsaturated fatty acids enhance LPL activity and generation of HDL from VLDL while stimulating the removal of VLDL remnants and LDL and concomitantly decreasing CETP activity and HDL catabolism (Fig. 1).

Preferably, the weight ratio of saturated fatty acids to polyunsaturated fatty acids included in dietary fat, modified fat, or blended fat composition ranges from 0.5:1.0 to 2.0:1.0; and the weight ratio is approximately ($\pm 20\%$) 1 to 1.

In a fifth related aspect, the invention features a liquid and/or solid dietary composition suitable for human

or animal ingestion for increasing the HDL concentration and the HDL/LDL concentration ratio in the blood serum. Essentially all of dietary fat which accounts for between 15% and 45% of the total dietary energy in liquid formula
5 diet, is provided by a single fat or a blended fat composition containing one part by weight polyunsaturated fat and at least one part by weight cholesterol-free saturated fat. The single fat or blended fat composition includes linoleic acid and at least one saturated fatty
10 acid selected from the group including lauric acid, myristic acid, and palmitic acid. The linoleic acid constitutes between 15% by weight and 40% by weight of the composition, and saturated fatty acid constitutes between 20% and 40% by weight of composition.

15 In preferred embodiments, dietary fat accounts for between 20% and 30% of the total dietary energy in the liquid formula diet; the saturated fatty acid is predominantly palmitic acid; and a reduction in cardiac arrhythmia accompanies the increase in HDL concentration
20 and the increase in HDL/LDL concentration ratio.

Suitable sources for cholesterol-free fats containing saturated fatty acids include saturated vegetable fats such as palm fat, coconut fat, and cocoa butter. Palm oil, palm olein, and palm kernel oil are particularly
25 useful sources for the saturated fatty acids.. Suitable sources for polyunsaturated fatty acids include the vegetable oils which are rich in linoleic acid such as corn oil, sunflower oil, safflower oil, soybean oil, and

cottonseed oil for example. The above-mentioned vegetable fats and oils can be blended in appropriate ratios according to the content of the above-mentioned saturated and polyunsaturated fatty acids therein, to produce dietary fat blends having the recommended proportions by weight of saturated and polyunsaturated fatty acids (see Tables I and II for the fatty acid content of various vegetable fats and oils as derived from published data [Agriculture Handbook No. 8-4, U.S.D.A. Science and Education Administration, Composition of Foods: Fats and Oils]).

TABLE I
POLYUNSATURATED VEGETABLE OILS

	<u>Safflower</u>	<u>Sunflower</u>	<u>Corn</u>	<u>Cottonseed</u>	<u>Soybean</u>	<u>Peanut</u>	<u>Canola</u>
<u>SATs (wt %)</u>							
total	9.1	10.3	12.7	25.9	14.4	16.9	7.1
14:0	0.1			0.8	0.1	0.1	
16:0	6.2	5.9	10.9	22.7	10.3	9.5	4.0
18:0	2.2	4.5	1.8	2.3	3.8	2.2	1.8
<u>MONOs (wt %)</u>							
total	12.1	19.5	24.2	17.8	23.3	46.2	58.9
18:1	11.7	19.5	24.2	17.0	22.8	44.8	56.1
20:1					0.2	1.3	1.7
<u>POLYs (wt %)</u>							
total	74.5	65.7	58.7	51.9	57.9	32.0	29.6
18:2	74.1	65.7	58.0	51.5	51.0	32.0	20.3
18:3	0.4		0.7	0.2	6.8		9.3

TABLE II
SATURATED VEGETABLE FATS

	<u>Coconut Oil</u>	<u>Cocoa Butter</u>	<u>Palm Oil</u>	<u>Palm Olein</u>	<u>Palm Kernel Oil</u>
<u>SATs (wt %)</u>					
total	86.5	59.7	49.3	43.7	81.4
12:0	44.6				47.0
14:0	16.8	0.1	1.0	0.8	16.4
16:0	8.2	25.4	43.5	38.9	8.1
18:0	2.8	33.2	4.3	4.0	2.8
<u>MONOs (wt %)</u>					
total	5.8	32.9	37.0	45.0	11.4
18:1	5.8	32.6	36.6	45.0	11.4
20:1			0.1		
<u>POLYs (wt %)</u>					
total	1.8	3.0	9.3	11.3	1.6
18:2	1.8	2.8	9.1	10.9	1.6
18:3		0.1	0.2	0.4	

For example, two parts palm oil (44% palmitic acid, 9% linoleic acid) can be blended with one part corn oil (11% palmitic acid, 58% linoleic acid) to provide a balanced fat blend containing approximately 33% palmitic acid (16:0) and 25% linoleic acid (18:2). Such cholesterol-free balanced fat blends are useful not only as dietary constituents that modulate plasma cholesterol to maximize the HDL/LDL ratio but also provide advantageous use in various cooking procedures such as in deep-fat frying.

10 The fat blends may also be used in shortening for baked prepared foods (including cakes, pies, cookies, crackers, etc.), in dairy products (including frozen desserts, creams, cheeses, spreads), and in blended food products (including salad dressing, margarines, mayonnaise). In

15 addition the fat blends may be used in liquid and/or solid dietary compositions for managing and controlling food intake such as for weight loss, control of hypercholesterolemia, or for managing any one of a variety of health conditions requiring a controlled diet in which

20 the proportion and composition of the dietary fat must be controlled. As a practical matter, the balanced mixture of saturated and polyunsaturated fatty acids can be provided not only as a natural blend of cholesterol-free saturated fats and polyunsaturated oils, but also as a

25 mixed fatty acid composition in the form of one or more modified or synthetic fats incorporating chemically or enzymatically interesterified fatty acids to achieve the

balanced proportion of saturated and polyunsaturated fatty acids described in this invention.

Other features and advantages of the invention will be apparent from the following description of the preferred
5 embodiments thereof, and from the claims.

Description of the Preferred Embodiments

The drawing will first briefly be described.

Drawing

The Figure is a diagrammatic representation of
10 lipoprotein metabolism.

Fatty Acid Balance

To understand the significance of, and reason for balancing the proportion of saturated and polyunsaturated fatty acids by selecting or engineering a single vegetable
15 oil species, or by blending two or more vegetable oils and/or fats for including in the fat-containing foods mentioned above such as cooking fats, prepared baked foods, dietary foods, and the like, one must understand some of the important parameters governing lipoprotein and
20 cholesterol synthesis and catabolism (see Figure).

The LDL/HDL ratio, and changes in this ratio depend upon a number of metabolic variables such as hormonal, metabolic, environmental and nutritional perturbations including changing dietary fat compositions which affect
25 lipoprotein levels. As detailed in Figure 1, it can be seen that both LDL and HDL are derived, in part, by the catabolic events resulting in the breakdown of VLDL (very low density lipoprotein), the TG (triglyceride)-rich

lipoprotein secreted by the liver for the purpose of delivering TG to muscle for energy generation or to adipose tissue for storage. In humans, the breakdown of VLDL is a major source of HDL as well as the primary
5 origin of LDL as described by Grundy et al., 31 J. Lipid Res. 1149, 1990. Thus, the potential mass for both HDL and LDL generation is dependent, in part, upon the production rate (mass per unit time) of VLDL secreted by the liver. On the other hand, reduction in the final
10 pool of circulating LDL depends both upon the proportion of the VLDL remnants which are retained and cleared by the liver directly (reducing diversion to LDL) as well as the rate of LDL removal by the liver once LDL is formed. Both VLDL remnants and LDL are cleared via liver receptors
15 (LDL_r), and both represent a "sink" for receiving HDL cholesterol esters (CE) via CETP (cholesterol ester transfer protein, see below), thereby reducing the HDL pool once it has been formed. The main function of HDL in this cholesterol-shuttle pathway is to "clean-up" the
20 cholesterol excess "spilled" during VLDL catabolism and then deliver it (as indicated above) as CE either to VLDL remnants or to LDL. These lipoproteins can then carry cholesterol back to the liver for excretion as bile acids (or biliary free cholesterol). Both the catabolism of
25 VLDL involving release of TG, and the CE shuttle from HDL to VLDL-LDL are controlled by proteins that are affected by dietary fat. The former process is modulated by lipoprotein lipase (LPL) and the latter by the transfer

protein CETP. These proteins are affected oppositely by the presence of saturated (SAT) and trans (elaidic acid-containing) fats on the one hand, versus polyunsaturated (POLY) fat on the other hand. SAT and trans fats induce increased CETP activity which is associated with increased LDL, and trans fats can even decrease HDL. However POLYs reduce the activity of CETP and enhance LPL activity and favor formation of HDL from VLDL as shown by Demacker et al., 21 Eur. J. of Clin. Invest. 197, 1991.

10 Applicant and other investigators have found that dietary fatty acids consumed in the form of natural fats or fat blends affect different lipoproteins and their concentrations in a number of ways. For example, for more than 30 years it has been appreciated that saturated fat increases total cholesterol (TC), whereas polyunsaturates decrease it, and monounsaturates were thought to be neutral (see Hegsted et al., 17 Am.J. of Clin. Nutr. 281, 1965, Hegsted et al., 57 Am. J. of Clin. Nutr. 875, 1993, and Heyden, 38 Ann. Nutr. Metab. 117, 1994).

20 More recently, investigators have focused on nutritional variables by which the different species of lipoproteins, as opposed to TC, are affected. The consensus is that most saturated fatty acids consumed as fats, i.e., twelve to fourteen carbon saturated fatty acids including lauric, 25 myristic, and palmitic acids (12:0, 14:0, and 16:0 respectively), have the potential for elevating both LDL and HDL, although the relative increase in LDL tends to be greater than that for HDL (see Grundy et al., 31 J.

Lipid Res. 1149, 1990, Pronczuk et al., 8 FASEB J., 1191, 1994, Katan et al., 60 suppl. Am. J. Clin. Nutr. 1017S, 1994 and Mensink et al., 12 Arteriosclerosis and Thrombosis 911, 1992). Adding to
5 the complexity, 14:0-rich TGs are more cholesterolemic than 16:0-rich TGs (see Hegsted et al., 17 Am. J. Clin. Nutr. 281, 1965, Sundram et al., 59 Am. J. Clin. Nutr. 841 1994, Hayes et al., 53 Am. J. Clin. Nutr. 491, 1991, and Hayes et al., 6 FASEB J. 2600,
10 1992), and the impact of 16:0 is highly dependent on the host "metabolic setpoint" for TC in the serum at the time of intervention. Thus in people with high TC, 16:0 acts as a cholesterol-raising fatty acid, but at TC <200mg/dl 16:0 typically appears neutral, neither raising nor
15 lowering TC (see Heyden, 38 Ann. Nutr. Metab. 117, 1994, and Hayes et al., 53 Am. J. Clin. Nutr. 491, 1991). On the other hand, 14:0-rich TGs are always cholesterol-raising, suggesting a different regulatory role for 14:0 and 16:0. Natural TGs, i.e. fats containing
20 the 12:0 fatty acid also contain 14:0, so for all practical purposes they can be considered together (12:0 + 14:0) and separate from 16:0, which is generally the most prevalent saturated fatty acid in fats derived from plant and animal sources, often without any 12:0+14:0.
25 Surprisingly, stearic acid (18:0) seems to be neutral in its regulatory behavior over TC (see Hegsted et al., 57 Am. J. Clin. Nutr. 875, 1993 and Katan et al., 60 suppl. Am. J. Clin. Nutr. 1017S, 1994)

Only one fatty acid, linoleic acid (18:2n6 or 18:2), is generally acknowledged to be cholesterol-lowering. As an essential or required dietary polyunsaturated fatty acid, it alone among all of the POLYs [including linolenic
5 or 18:3n3, eicosapentenoic (EPA) or 20:5n3, and docosahexenoic acid (DHA) or 22:6n3] consistently lowers TC, especially lowering LDL-C but also decreasing HDL-C at high dietary intake of POLYs (Grundy et al., 31 J. Lipid Res. 1149, 1990, Hegsted et al., 17 Am. J. Clin.
10 Nutr. 281, 1965, and Hegsted et al., 57 Am. J. Clin. Nutr. 875, 1993). In fact, this tendency for 18:2 to lower HDL has even led to warnings against recommending POLYs as a means for lowering TC. Rather, the recommendation has been offered that monounsaturated fats
15 (MONOs) containing oleic acid (18:1) should replace saturated fat as much as possible because MONOs do not lower HDL like POLYs do, and replacing saturates with MONOs will primarily lower LDL as suggested by Grundy et al., 31 J. Lipid Res. 1149, 1990.

20 As applicant will describe below, the later statement is true, but it ignores the critical role of POLYs, and the fact that it is a critical balance between dietary intake of SATs and POLYs (both at moderate intake) which actually allows HDL to increase to yield the highest
25 serum HDL/LDL ratio, at least in humans with normal cholesterol metabolism.

Over the past few years a number of nutritional experiments using animal models and humans are relevant to

Applicant's finding of fatty acid proportions required for generating the highest HDL/LDL ratio. The first relevant study was in monkeys (Hayes et al., 53 Am. J. Clin. Nutr. 491, 1991). In that report it was found that for 5 SATs, 16:0 increased TC less than 12:0+14:0, but quite surprisingly 16:0 had an effect on TC very similar to POLYs (18:2) when 5% of the daily dietary calorie intake (abbreviated 5% en) was exchanged between these 2 fatty acids (between 5-10% en as 18:2, ie. Diets 4 vs. 5 in the 10 cited study). At the time of the study, the authors failed to appreciate the significance of the fact that once 5 % en as 18:2 in the daily diet has been achieved, additional dietary 18:2 does not really exert much effect on TC and can be exchanged for other "neutral" fatty acids 15 without altering TC appreciably. This relationship has been described as the "threshold effect" for 18:2 (Hayes et al., 6 FASEB J. 2600, 1992 and Pronczuk et al., 8 FASEB J. 1191, 1994).

In a second study in rhesus monkeys (Khosla et al., 20 1083 Biochem. et Biophys. Acta 46, 1991), the authors explored possible metabolic reasons for differences observed in TC during the exchange of (16:0 + 18:1) for (12:0+14:0) [Diet 4 versus Diet 2 in the cited study]. It was found that the former fatty acids (16:0 + 18:1) led to 25 3-fold more VLDL output than the (12:0+14:0) diet, and that the (12:0+14:0) diet produced a larger LDL pool and a poorer (lower) HDL/ LDL ratio. The authors interpreted this to mean that dietary (12:0+14:0) fatty acids were

worse than 16:0 (and 18:1) in terms of raising LDL, presumably because (12:0+14:0) down-regulate the LDL, making it difficult for VLDL remnants and LDL particles to be cleared by the liver. This ultimately causes LDL to
5 accumulate.

In a third monkey study (Khosla et al., 55 Am.J. Clin. Nutr. 51, 1992) the effect of high dietary intake of SAT 16:0 in the form of palm oil, versus high dietary intake of MONO 18:1 in the form of high oleic safflower
10 oil, and also versus high dietary intake of POLY 18:2 in the form of high linoleic safflower oil was examined. Here the TC response was animal species specific, with all three fats causing an equal TC response in rhesus. However the high dietary 18:2 (at 30 % en) produced lower
15 TC in the cebus species by virtue of an undesirable depressed HDL-C level while the LDL-C was unaffected by all three diets in both species. These data indicated that genetic differences can affect the sensitivity to 18:2 in the diet, but that 16:0, 18:1, and 18:2 can appear
20 to exert similar effects when lipoprotein metabolism is unimpaired and when essentially no dietary cholesterol is present to interfere with LP metabolism (especially by decreasing LDL receptor number and LDL clearance rate).

An interesting observation and measurement recorded in
25 the above cited study and unexplained until now was a favorable HDL/LDL ratio which was greater in monkeys fed the 16:0-containing SAT diet than the MONO or POLY diet. This observation contradicted the generally held belief

that dietary SATs should be avoided in favor of POLYs and MONOs. However, this early measurement taken together with the more extensive new data provided in Appendix I now indicate that saturated fatty acids are a necessary
5 dietary component for increasing HDL and increasing the HDL/LDL ratio in the serum.

In other previous experiments using saturated animal fats blended with POLYs described in Perlman and Hayes, supra, it is noted that rodents (gerbils and hamsters) and
10 monkeys (cebus) exhibited unexpectedly increased HDL/LDL lipoprotein ratios when corn oil (rich in 18:2) was blended into animal fats stripped of cholesterol. These data are also consistent with the model now proposed in which a balanced ratio of SATs and POLYs in the diet may
15 be the most important consideration in modulating lipoproteins to increase HDL and maximize the HDL/LDL ratio.

The discovery confirming and validating applicant's new model appears in the human nutritional study involving
20 three different diets described in Sundram et al. (hereby incorporated by reference in totality, Nutritional Biochemistry Vol 6:179-187, 1995). The most critical results from this study are summarized in Table III.

TABLE IIIHDL CONCENTRATION IN HUMAN SERUM VARIES WITH RATIO OF SATURATED
TO POLYUNSATURATED FATTY ACIDS IN DIETARY FAT

<u>Dietary Fat (code)</u>	<u>Dietary Fat Composition (Weight Percentage)</u>			<u>Percent Dietary Energy (Percentage of Daily Calories)</u>			<u>Serum Cholesterol (mg/dl concentration)</u>		
	<u>SAT</u>	<u>MONO</u>	<u>POLY</u>	<u>16:0 SAT</u>	<u>18:1 MONO</u>	<u>18:2 POLY</u>	<u>HDL-C</u>	<u>LDL-C</u>	<u>TC</u>
CAN	7	57	36	4	17	6	49	97	177
POL	44	45	11	11	13	3.5	49	102	181
AHA	30	37	33	8	12	7	57	96	179

These diets included one containing low dietary SATs combined with moderate POLYs and high MONOs (canola oil diet-abbreviated CAN), a second containing high dietary SATs combined with low POLYs and moderate MONOs (palm olein-abbreviated POL), and a third containing moderate dietary SATs combined with moderate POLYs and moderate MONOs (soybean oil-palm olein-canola oil blend-abbreviated AHA). Indeed, all three fat-containing diets produced equal TC and similar LDL-C, but the AHA fat blend increased HDL-C by 20% (see Table III) relative to the other two diets. Thus, Applicant unexpectedly discovered that normolipemic people (i.e., people with normal lipoprotein metabolism and exhibiting serum TC values of <200mg/dl) appear to require moderate levels of both SATs and POLYs which, in appropriate total dietary amounts, produce an increased HDL concentration and increased HDL/LDL ratio in the serum.

In order to provide a general method for maximizing the HDL/LDL ratio in human serum it is useful to understand the physiological basis by which the HDL/LDL ratio may be altered. Returning to Figure 1 and the experimental observations reported on herein, it appears that SATs (16:0 in the above diet) drive VLDL output, maximizing the potential for HDL production (i.e., increasing the HDL precursor pool of VLDL). Since high dietary levels of MONOs did not increase HDL while moderate levels of SATs did increase HDL, it would appear

that 16:0 (not 18:1) may have been responsible for the greatest VLDL output in the previous rhesus study (Khosla et al., 55 Am. J. Clin. Nutr. 51, 1992). Secondly, it seems that an adequate intake of POLYs [which must exceed
5 the 3.3 % en shown to be sub-optimal in the low-POLY diet in the appendix is needed to assure up-regulated or stimulated LDL_r activity. This level of POLYs is estimated to be at least 5-6% en and has been described elsewhere as "assuring the 18:2 threshold requirement"
10 (Hayes et al., 6 FASEB J. 2600, 1992 and Pronczuk et al., 8 FASEB J. 1191, 1994). This intake of POLYs also assures that VLDL catabolism and LDL clearance proceeds efficiently and rapidly (decreasing plasma LDL) while sparing the need for HDL "clean-up" (ultimately increasing
15 available HDL). Viewed as a balancing process, adequate SATs are needed to enhance HDL precursor output (as VLDL) and adequate POLYs are needed to keep LDL_r up-regulated to enhance LDL and VLDL remnant clearance by the liver. Together this combination results in the highest HDL and
20 lowest LDL levels in the serum. To applicant's knowledge neither this combination of fatty acids nor this rationale for metabolic function has ever been recognized, let alone demonstrated in humans prior to this time.

The importance of diversifying the dietary intake of
25 polyunsaturated fatty acids to include one or more of the omega3 polyunsaturates [i.e., α -linolenic acid (18:3, omega3), eicosapentenoic acid (EPA) and docosahexenoic acid (DHA)], in addition to linoleic acid (18:2, w6), has

recently been pointed out by Charnock et al. (3rd Int. Symp. on Lipid Metabolism in the Normal and Ischemic Heart, Sept. 1991) and by McLennan et al. (19 Aust. NZ J. Med. 1, 1989). According to these investigators, adding
5 the above-mentioned omega3 polyunsaturated fatty acids to the diet improved the mechanical performance and the electrical stability of the marmoset heart. In this animal model the incidence of ventricular fibrillation was reduced while ventricular ejection, peak filling rate and
10 end diastolic volume increased when compared to animals fed similar diets containing only polyunsaturates of the w6 type, e.g., linoleic acid. In marmosets fed saturated animal fats in place of comparable amounts of sunflower oil (linoleic acid-rich oil) or fish oil (omega3-rich
15 oil), cardiac performance deteriorated significantly with respect to both mechanical and electrical parameters.

As taught in the present invention, there are several straightforward means of providing a mix, and controlling the balance of saturated and polyunsaturated fatty acids
20 in ones daily dietary fat. In the extreme case, the strictly controlled use of liquid and/or solid dietary formulations which provide all of the dietary fat can be used to insure this balance. In a moderately controlled setting, institutional preparation of food for resident
25 populations allows the monitored use of fats, e.g., hospital, university, and military kitchens, in which appropriately balanced fat blends can be used throughout the food preparation scheme. In addition, manufacturers

of prepared food such as commercial bakers can use appropriately balanced blends of fats and oils.

Example 1: Fat Blends for Increasing the HDL Concentration and the HDL/LDL Ratio

5 Two parts palm oil (44% palmitic acid, 9% linoleic acid) are blended with one part corn oil (11% palmitic acid, 58% linoleic acid) to provide a balanced fat blend containing approximately 33% palmitic acid (16:0) and 25% linoleic acid (18:2). When consumed as the principal and
10 essentially the sole source of dietary fat in the daily diet, and representing approximately 30% of the dietary energy this fat blend will increase the level of HDL cholesterol in human serum and the HDL/LDL ratio compared to a similar diet in which the proportion of either
15 palmitic acid or linoleic acid is 3-fold lower.

Example 2: Other Fat Blends for Increasing HDL and the HDL/LDL Ratio

One part palm oil (44% palmitic acid, 9% linoleic acid) is blended with one part cottonseed oil (23%
20 palmitic acid, 52% linoleic acid) to provide a fat blend containing approximately 34% palmitic acid and 31% linoleic acid. One part palm oil is blended with one part soybean oil (10% palmitic acid, 51% linoleic acid and 7% linolenic acid) to provide a fat blend containing
25 approximately 27% palmitic acid, 30% linoleic acid and 3% linolenic acid. Alternatively, one part coconut oil (approximately 70% lauric, myristic, and palmitic acids, and 2% linoleic acid) is blended with one part sunflower

oil (6% palmitic acid, 66% linoleic acid) to provide a different balanced fat blend containing approximately 38% C12-C16 mixed saturated fatty acids and 34% linoleic acid. Alternatively, in a three component system, one part palm
5 kernel oil (47% lauric acid, 16% myristic acid, 8% palmitic acid, and 2% linoleic acid) is blended with one part corn oil (11% palmitic acid and 58% linoleic acid) and one part canola oil (4% palmitic, 20% linoleic acid and 9% linolenic acid) to provide a fat blend containing
10 29% C12-C16 mixed saturated fatty acids, 27% linoleic acid, and 3% linolenic acid. In another three component system termed the AHA blend (see Table I), four parts palm oil are blended with five parts soybean oil and one part canola oil to provide a fat blend containing 26% palmitic
15 acid, 29% linoleic acid, and 3% linolenic acid. In still another three component system, three parts palm olein (39% palmitic acid, 11% linoleic acid) are blended with one part cottonseed oil (23% palmitic acid, 52% linoleic acid) and one part safflower oil (6% palmitic acid, 74%
20 linoleic acid) to provide a fat blend containing 29% palmitic acid and 32% linoleic acid.

Example 3: Oxidation-Resistant Fat Blends for Food Preparation as well as for Increasing the HDL Concentration and the HDL/LDL Ratio

25 Consistent with Examples 1 and 2, blends useful for increasing the HDL level and the HDL/LDL ratio in human serum include four to nine parts palm olein (39% palmitic acid, 11% linoleic acid) blended with one part of

corn oil (11% palmitic acid, 58% linoleic acid) to provide a dietary fat blend containing approximately 33% to 36% palmitic acid and 20% to 16% linoleic acid. Similarly, two parts palm olein are blended with one part of corn oil
5 to provide a fat blend containing approximately 30% palmitic acid and 27% linoleic acid. Likewise, as illustrated in Example 1, two parts palm oil are blended with one part corn oil for use as a dietary fat. These and other blends of vegetable fats and oils have been
10 found to be valuable as ingredients in baked, fried, and other prepared foods, e.g., salad dressings, desserts, etc. because of the increased oxidative stabilities of these blends in combination with their metabolic benefits already described. The increase in oxidative stability
15 for the polyunsaturated vegetable oil component in these blends is reflected in a longer shelf life for foods prepared using these blends, and a longer cooking (i.e., frying) lifetime for these blends when they are maintained at an elevated temperature (approximately 350°F) for many
20 hours.

By way of specific example, when blended with palm oil or palm olein, the oxidation-resistance of certain polyunsaturated vegetable oils is increased relative to that of the same oil when heated separately
25 from the blended composition. In this Example and in Table IV, the stability of various oils and blends was measured by the Rancimat method in which the oxidative stability is directly proportional to the Rancimat number

provided. A fat blend in which the oxidative stability of the blend is at least 25% greater than that of the polyunsaturated vegetable oil component in the blend is considered an oxidation-resistant blend for the purposes
5 of this invention.

The extent of oxidation-resistance in such blends has been found to vary widely depending upon the type of vegetable oil (e.g., corn versus soybean oil) and the extent of its dilution into the saturated fat such as palm
10 fat. Accordingly, it is apparent from Table IV that at higher dilutions of polyunsaturated vegetable oils (e.g., 5-fold and 10-fold dilutions of soybean oil into the palm fats), the fat blends maintains good stability. However, when diluted only 3.3-fold (see 2.3:1 column in Table IV),
15 and within the composition range nutritionally useful in the present invention, the oxidative stability of the soybean oil-palm fat blends can fall to approximately the same level as the unblended vegetable oil (cf. 7.6 and 5.6 for the blends versus 6.3 for the soybean oil alone).
20 Surprisingly however, Table IV reveals that corn oil can be stabilized against oxidation at both lower (3.3-fold) and higher (5 and 10-fold) dilutions with palm fat. Thus, the oxidative stability of the corn oil-palm blends is at least two-fold greater than the corn oil alone (cf. 11.2
25 and 9.9 for the lower dilution blends versus 4.8 for the corn oil alone). The results from this Table, and from previous unpublished experiments of Applicant have shown that the oxidative stability of fat and oil blends is

unpredictable and can only be determined by experimentation. It is significant that the proportions of a number of fats and oils in such blends which are useful in the diet for controlling cholesterol levels as taught herein, are also useful owing to their oxidative stabilities.

TABLE IV

OXIDATIVE STABILITY OF FAT BLENDS
(Rancimat method*)

10	Ratio	(Palm olein : Polyunsaturated oil)	
	<u>Polyunsaturated oil</u>	<u>2:1</u>	<u>4:1</u> <u>2.3:1</u>
	soybean	16	14.4 7.6
	corn	16.7	13.5 11.2
15	Ratio	(Palm oil : Polyunsaturated oil)	
	<u>Polyunsaturated oil</u>	<u>2:1</u>	<u>4:1</u> <u>2.3:1</u>
	soybean	14.4	10.2 5.6
	corn	15.3	12.2 9.9

20 OXIDATIVE STABILITY OF PURE FATS AND OILS

Palm olein	20
Palm oil	21.2
soybean oil	6.3
corn oil	4.8

*The Rancimat method determines the oxidative and thermal stability towards oxidative decomposition in oils and fats. The oil sample is exposed to a stream of atmospheric oxygen at elevated temperatures giving rise to organic acids in the oil/fat. These volatile products are trapped in a measuring vessel filled with distilled water and continuously detected with a conductivity cell. The measurements are then evaluated by a control unit which records the induction time of the sample. The progress of the oxidation curve determined in this manner virtually parallels the development of the peroxide values in the oils being tested.

Other embodiments are within the following claims.

Claims

1. A method of increasing the HDL concentration and the HDL/LDL concentration ratio in human serum by providing a balance between a sufficient and required
5 proportion of cholesterol-free saturated fatty acids in the daily dietary fat of said human and a sufficient and required, but not excessive proportion of polyunsaturated fatty acids comprising linoleic acid in said dietary fat, while the remaining proportion of fatty acids and energy
10 from said dietary fat is provided by monounsaturated fatty acids comprising oleic acid, said method comprising: ingesting said dietary fat, wherein said saturated fatty acids selected from the group comprising palmitic acid, myristic acid, lauric acid and combinations thereof must
15 constitute between 20% and 40% by weight of the daily dietary fat based upon said dietary fat accounting for 30% of the total dietary energy consumption, and wherein said linoleic acid must constitute between 15% and 40% by weight of said dietary fat, whereby the required
20 proportional intake of said polyunsaturated fatty acids enhances the formation of HDL from VLDL and/or decreases the clearance of HDL, while an excessive proportional intake of said polyunsaturated fatty acids and said monounsaturated fatty acids is avoided to assure a
25 sufficient dietary availability of said saturated fatty

acids which are required for sufficient VLDL synthesis and HDL production.

2. The method of claim 1, wherein said cholesterol-free saturated fatty acids comprise palmitic acid.

5 3. The method of claim 1, wherein said cholesterol-free saturated fatty acids comprise lauric acid and myristic acid.

4. The method of claim 1, wherein the proportion of monounsaturated fatty acids in the daily dietary fat is
10 between 20% and 50% oleic acid and no greater than 1% elaidic acid, or other unnatural trans fatty acids by weight.

5. The method of claim 1, wherein said polyunsaturated fatty acids comprise linoleic acid and at
15 least one other polyunsaturated fatty acid selected from the group including α -linolenic acid, eicosapentenoic acid (EPA), and docosahexenoic acid (DHA).

6. The method of claim 1, wherein the proportion of saturated fatty acids in the daily dietary fat is at least
20 20% by weight and said dietary fat comprises less than 5% by weight stearic acid.

7. A method of decreasing the LDL concentration in human serum by providing saturated fatty acids in the daily diet in a proportion between 20% and 40% by weight of the daily dietary fat based upon said dietary fat accounting for 30% of the total dietary energy consumption, and maintaining a proportion of polyunsaturated fatty acids comprising linoleic acid in the daily diet at the expense of monounsaturated fatty acids comprising oleic acid and/or elaidic acid, wherein said linoleic acid constitutes between 15% and 40% by weight of said dietary fat, whereby removal of plasma VLDL remnants and LDL is maximized, and the production of LDL is reduced.

8. A method of increasing the HDL and stabilizing or decreasing the LDL concentration in human serum by providing saturated fatty acids in the daily diet in a proportion between 20% and 40% by weight of the daily dietary fat based upon said dietary fat accounting for 30% of the total dietary energy consumption, whereby the production of VLDL, as the HDL precursor, is adequately sustained and is not rate limiting in HDL biosynthesis, and maintaining a proportion of polyunsaturated fatty acids comprising linoleic acid in the daily diet at the expense of monounsaturated fatty acids comprising oleic acid and/or elaidic acid, wherein said linoleic acid constitutes between 15% and 40% by weight of said dietary

fat, whereby VLDL catabolism to HDL is facilitated and hepatic clearance of VLDL remnants and LDL is enhanced.

9. A method of increasing the HDL concentration and the HDL/LDL concentration ratio in human serum by the dietary consumption of foods prepared using a cholesterol-free single fat or blended fat composition containing a ratio of one part by weight polyunsaturated fatty acids to at least one part by weight saturated fatty acids, wherein said single fat or blended fat composition comprises linoleic acid and at least one saturated fatty acid selected from the group including lauric acid, myristic acid, and palmitic acid, said linoleic acid constituting between 15% by weight and 40% by weight of said composition and said saturated fatty acid constituting between 20% and 40% by weight of said composition, whereby adequate dietary levels of saturated fatty acids in the absence of cholesterol stimulate VLDL synthesis and secretion by the liver, and adequate dietary levels of linoleic acid enhance LPL activity and generation of HDL from VLDL while stimulating the removal of VLDL remnants and LDL and concomitantly decreasing CETP activity and HDL catabolism.

10. The method of claim 1,7,8, or 9, wherein the food source of said saturated fatty acids comprises at least one vegetable fat selected from the group including palm fat, coconut fat and cocoa butter.

11. The method of claim 10, wherein said palm fat is selected from the group including palm oil, palm olein, and palm kernel oil.

12. The method of claim 1,7,8, or 9, wherein the food source of said polyunsaturated fatty acids comprises at least one vegetable oil selected from the group including corn oil, sunflower oil, safflower oil, soybean oil, cottonseed oil, canola oil, and peanut oil.

13. The method of claim 1, wherein said polyunsaturated fatty acids comprise linoleic acid and linolenic acid.

14. The method of claim 13, wherein said linolenic acid is contributed by soybean oil, canola oil, edible flax seed oil, and/or perrilla seed oil.

15. The method of claim 9, wherein providing within said cholesterol free blended fat composition, a proportion of at least one part by weight cholesterol-free saturated fat to one part by weight polyunsaturated fat, stabilizes the polyunsaturated fat against oxidation.

16. The method of claim 15, wherein the oxidation-resistance of said cholesterol free blended fat composition upon heating to a temperature of 100°C or greater in air is increased by at least 25% compared to

the oxidation resistance of the polyunsaturated fat when heated separately from said blended fat composition.

17. The method of claim 1,7, or 8, wherein essentially all of said dietary fat is provided in a
5 nutritionally balanced liquid and/or solid formula diet in which said dietary fat accounts for between 15% and 45% of the total dietary energy consumption.

18. The method of claim 17, wherein said dietary fat accounts for between 20% and 30% of the total dietary
10 energy consumption.

19. The method of claim 9, wherein in place of said dietary consumption of foods prepared using a single fat or blended fat composition, is substituted the dietary
15 consumption of a nutritionally balanced liquid formula diet prepared using a single fat or a blended fat composition in which the total fat content therein accounts for between 15% and 45% of the total dietary energy consumption.

20. The method of claim 1,7,8, or 9, wherein said daily dietary fat or said foods contain a blended fat composition comprising one part by weight of at least one polyunsaturated vegetable oil selected from the group including corn oil, sunflower oil, safflower oil, soybean
25 oil, cottonseed oil, canola oil, and peanut oil blended

with at least one part by weight of vegetable fat comprising saturated fatty acids.

21. The method of claim 20, wherein said vegetable fat is selected from the group including palm fat, coconut fat and cocoa butter.

22. The method of claim 21, wherein said palm fat is selected from the group including palm oil, palm olein, and palm kernel oil.

23. A method of increasing the HDL concentration and the HDL/LDL concentration ratio in human serum by the dietary consumption of foods prepared using at least one modified fat selected from the group including a chemically interesterified fat, an enzymatically interesterified fat, and a synthetic fat, wherein said modified fat comprises one part by weight polyunsaturated fatty acids and at least one part by weight saturated fatty acids selected from the group including lauric acid, myristic acid, and palmitic acid, said polyunsaturated fatty acids constituting between 15% by weight and 40% by weight of said modified fat and said saturated fatty acids constituting between 20% and 40% by weight of said modified fat, whereby adequate dietary levels of saturated fatty acids in the absence of cholesterol stimulate VLDL synthesis and secretion by the liver, and adequate dietary levels of polyunsaturated fatty acids enhance LPL activity

and generation of HDL from VLDL while stimulating the removal of VLDL remnants and LDL and concomitantly decreasing CETP activity and HDL catabolism.

24. The method of claim 1,7,8,9, or 23, wherein the
5 weight ratio of said saturated fatty acids to polyunsaturated fatty acids included in said dietary fat, modified fat, or blended fat composition ranges from 0.5: 1.0 to 2.0 : 1.0.

25. The method of claim 24, wherein said weight ratio
10 is approximately 1 to 1.

26. A liquid and/or solid dietary composition suitable for human or animal ingestion for increasing the HDL concentration and the HDL/LDL concentration ratio in the blood serum, wherein essentially all of the dietary
15 fat which accounts for between 15% and 45% of the total dietary energy in said liquid formula diet, is provided by a single fat or blended fat composition containing one part by weight polyunsaturated fat and at least one part by weight cholesterol-free saturated fat, wherein said
20 single fat or a blended fat composition comprises linoleic acid and at least one saturated fatty acid selected from the group including lauric acid, myristic acid, and palmitic acid, said linoleic acid constituting between 15% by weight and 40% by weight of said composition and said

saturated fatty acid constituting between 20% and 40% by weight of said composition.

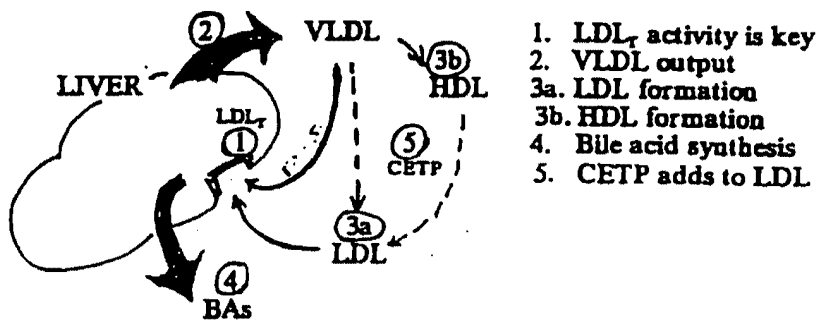
27. The dietary composition of claim 26, wherein said
5 dietary fat accounts for between 20% and 30% of the total dietary energy in said liquid formula diet.

28. The dietary composition of claim 26, wherein said saturated fatty acid is predominantly palmitic acid.

29. The method of claim 1, 5, or 13, wherein a
10 reduction in cardiac arrhythmia can accompany the increase in HDL concentration and the increase in HDL/LDL concentration ratio.

30. The method of claim 1, 7, 8 or 9, wherein the food source for both said saturated and said
15 polyunsaturated fatty acids comprises a genetically selected or engineered vegetable oil-bearing single plant species.

METABOLIC KEY TO DIETARY IMPACT ON LIPOPROTEIN METABOLISM



Hayes et al, 1993

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/04588

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : A61K 47/00; A23D 7/00

US CL : 426/2, 601

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)

U.S. : 426/2, 601

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Bailey's Industrial Oil and Fat Products, volume 1, 4TH ED. 1979, D. SWERN, editor, pages 311-332, 363-368, especially page 364.	1-30

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*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
A document defining the general state of the art which is not considered to be of particular relevance	*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
E earlier document published on or after the international filing date	*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
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)	*Z* document member of the same patent family
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	

Date of the actual completion of the international search 19 MAY 1996	Date of mailing of the international search report 03 JUN 1996
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer <i>Debbie Thomas</i> CAROLYN PADEN Telephone No. (703) 308-3294

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

11/451,606**APPLICATION AS FILED – PART I**

(Column 1)

(Column 2)

**OTHER THAN
SMALL ENTITY**

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))		
SEARCH FEE (37 CFR 1.16(k), (l), or (m))		
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		
TOTAL CLAIMS	26	6
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	
APPLICATION SIZE FEE (37 CFR 1.16(s))		
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))		

RATE (\$)	FEE (\$)
X\$25=	
X\$100=	
N/A	
TOTAL	

OR

RATE (\$)	FEE (\$)
	300
	500
	200
X\$50	300
X\$200=	
.....	
N/A	
TOTAL	1300

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

(Column 1)

(Column 2)

(Column 3)

SMALL ENTITY

OR

**OTHER THAN
SMALL ENTITY**

AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				

RATE (\$)	ADDI- TIONAL FEE (\$)
X =	
X =	
N/A	
TOTAL ADD'T FEE	

OR

OR

OR

OR

OR

RATE (\$)	ADDI- TIONAL FEE (\$)
X =	
X =	
N/A	
TOTAL ADD'T FEE	

AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				

RATE (\$)	ADDI- TIONAL FEE (\$)
X =	
X =	
N/A	
TOTAL ADD'T FEE	

OR

OR

OR

OR

OR

RATE (\$)	ADDI- TIONAL FEE (\$)
X =	
X =	
N/A	
TOTAL ADD'T FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.