



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 (22) International Filing Date: 11 January 1994 (11.01.94) (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 Vlaardingen (NL).		(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). Published <i>With international search report.</i>	
(54) Title: NATURAL PUFF-PASTRY MARGARINES			
(57) Abstract			
<p>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: H₃ = 3-30 wt %, H₂U = 25-60 wt %, HU₂ + U₃ < 65 wt %, H = saturated fatty acid C₁₆-C₂₂, U = unsaturated fatty acid C₁₈-C₂₂ which emulsions display at temperatures between 5-30 °C a hardness of 1200-2000 and a solid fat index, such that at a preselected temperature between 5 and 30 °C C/N² ≥ 1.5.</p>			

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

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
35 at least at a pre-selected working temperature

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

- 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.

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 : N₁₀ = 78
 N₂₀ = 66
 N₃₀ = 47
 N₃₅ = 38

20

Palm oil mid-fraction : N₁₀ = 92
 N₂₀ = 79
 N₃₀ = 11
 N₃₅ = 3

25

Palm oil : N₂₀ = 25
 N₃₀ = 9
 N₃₅ = 5

30

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

35

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).

	<u>Blend</u>	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
25 followed therefor.

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

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 :

H_3 = 3-30 wt.% calculated on the fat, preferably 5-25 wt%;

H_2U = 25-60 wt.% calculated on the fat, preferably 35-55 wt.%;

$HU_2 + U_3$ = < 65 wt.% calculated on the fat, preferably 30-50 wt.%, in which

H = saturated fatty acid $C_{16}-C_{22}$;

U = mono- or polyunsaturated fatty acid $C_{18}-C_{22}$;

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 (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 C and N of the emulsion are such that $\frac{C}{N^2}$ at the working temperature is 1.5-2.5.

3. Puff-pastry margarine according to Claim 1 or 2, wherein the fat contains less than 4 wt.%, preferably less than 1 wt.% of H_2E fats, H as above, E = elaidic acid.

4. Puff-pastry margarine according to Claims 1-3, wherein the fat content is at least 80 wt.%.

5. Puff-pastry margarine according to Claims 1-4, wherein the fat is chosen from the group consisting of palm oil, or palm oil fractions, in particular palm oil stearin, palm oil mid-fraction or mixtures thereof.

6. Puff-pastry margarine according to Claims 1-5, 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 palm oil and 0-40 wt.% of a liquid oil.

7. Puff-pastry margarine according to Claims 1-6, wherein the solid fat content (UMA-1) of the fat at working temperature is less than 38.

8. Puff pastries containing as fat component the puff-pastry margarines of Claims 1-7.

9. Puff pastries according to Claim 8, wherein the gravity index of the puff pastries is 1.0-1.4.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 94/00066

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 5 A23D7/00 A21D13/08

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 5 A23D A21D

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.
Y	EP,A,0 206 674 (UNILEVER PLC) 30 December 1986	1-5,8
A	see page 5, paragraph 2; claims 8-13,15 see page 3, line 29 - page 4, line 5 ---	6
Y	EP,A,0 078 568 (THE PROCTER & GAMBLE COMPANY) 11 May 1983	1-5,8
A	see page 6, line 30 - line 32; claims 1,7,9,10,12,14 see page 8, line 15 - line 21 see page 25, line 21 - page 26, line 8 -----	6



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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Date of the actual completion of the international search

7 April 1994

Date of mailing of the international search report

15.04.94

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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