

**SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES**

2020
Bogotá, D. C., 20 de agosto de 2010

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 07-039677- -00003-0000

Fecha: 2010-09-01 13:58:42 Dep. 2020 DIR.NUEVASCR
Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 519 TRASLADOINFORME Folios: 1

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ASUNTO	Radicación	07-39677
	Trámite	002
	Evento	001
	Actuación	430
	Oficio	
	Folios	015

Patente de Invención ☒ Patente de Modelo de Utilidad ☐
Vía Nacional ☒
Vía PCT (fase nacional) ☐ Cap. I ☐ Cap. II ☐

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. Documentos estudiados

1.1. Descripción: Folios: 4 a 10 tal como se radicó inicialmente
1.2. Reivindicaciones: Folios 11 tal como se radicó inicialmente

2. Objeto de la invención

- Título de la solicitud (folio 1)
Margarina culinaria con propiedades de mínimo quemado y bajo salpique.
- Las reivindicaciones 1 a 7 de la solicitud en estudio se refieren a
Una margarina con mínimo quemado y bajo nivel de salpique caracterizada porque contiene de 0% a 1% en peso de leche y/o productos lácteos y de 0,3% a 2,5% en peso de emulsificantes.
- El anterior procedimiento busca proporcionar una margarina con bajo nivel de quemado y bajo salpique.
- La Clasificación Internacional de Patentes (IPC) para esta solicitud es
A 23 D 7/00.

3. De la solicitud de Patente

3.1. Descripción (Artículo 28 D. 486)

La descripción de la solicitud en estudio presenta los siguientes defectos:

- El solicitante define en los primeros párrafos de la descripción las características básicas de las margarinas, elementos que conoce cualquier técnico en la materia. Pero en el momento de definir su invención (folios 7 y siguientes) divulga de forma genérica como suyos elementos que da a entender que también sabe un técnico en la materia. Por ejemplo habla que "las características novedosas de la presente margarina se logran por medio de una formulación especial", cita en el folio 7 líneas 13 y siguientes los mismos ingredientes de la margarina tradicional relacionados en el folio 4, luego habla de la importancia de los emulsificantes y que la innovación se logra "por medio de un balance apropiado de emulsificantes" (sin especificar como y dando a entender que un técnico lo conoce) y luego cita los emulsificantes del mercado que son de uso común en la técnica, luego relaciona que el mejor sistema emulsificante debe estar constituido por mezclas de ciertos productos de uso común en el arte y sin haber definido realmente su supuesta invención relaciona una modalidad preferida. Lo anterior conlleva a que el solicitante no define adecuadamente el objeto a proteger, no divulga realmente la composición que ha logrado, no es claro en la exposición de su documento y se limita a expresar conceptos subjetivos y ambiguos que no permiten delimitar el alcance de su solicitud.

El solicitante debió explicar cuales específicamente eran las características que consideraba novedosas, cual es el balance apropiado de emulsificantes, cual o cuales son las combinaciones que no existían en la técnica y que el ahora va a usar, etc. No es suficiente describir las supuestas ventajas de la composición, (inclusive la mayoría de las relacionadas son totalmente innecesarias, repetitivas y se pueden obviar); lo que sí es necesario es una descripción clara y completa de la invención que permita a un técnico que conozca del arte reproducir la supuesta invención en su totalidad.

También debe recordar el solicitante que la modalidad preferida es precisamente eso, una modalidad; pero no corresponde necesariamente al objeto real a proteger.

Por lo anterior, la descripción no cumple con el requisito de claridad y/o divulgación completa que permita su comprensión y ejecución de acuerdo al art. 28 de la Decisión 486 y/o art. 22 del Tratado PCT

4. Determinación del Estado de la Técnica

- La fecha que se ha tenido en cuenta para determinar el estado de la técnica es *20 de abril de 2007*
- Teniendo en cuenta la fecha indicada se realizó la búsqueda en el estado de la técnica de documentos relacionados con la solicitud encontrándose los siguientes documentos más relevantes:

Nº	Documento	Título	Fecha de publicación*
D1	GB 1 404 651	Food compositions	03.09.1975
D2	GB 1 341 964	Improvements in or relating to edible emulsions	28.12.1973
D3	GB 1 254 191	Spreadable fats	17.11.1971
D4	US 3 721 570	Milk free margarine	20.03.1973

5. Análisis de patentabilidad (Artículo 14 D. 486)

El solicitante desea que se le proteja una margarina caracterizada porque contiene de 0% a 1% en peso de leche y/o productos lácteos y de 0,3% a 2,5% en peso de emulsificantes.

Lo que relaciona el solicitante lo conoce cualquier técnico que entienda del arte pues es de uso común en la técnica.

Nótese que el solicitante plantea el problema del quemado de las margarinas y la solución que relaciona es el retiro en su totalidad, o casi en su totalidad, de la leche. El documento D1 señala específicamente el mismo problema y la misma solución (ver columna 1); allí se dice que el quemado y las coloraciones indeseables son substancialmente inexistentes en las margarinas libres de leche. Es decir, D1 señala expresamente que para la fecha de presentación de dicho documento (20 de julio de 1972) existían las margarinas sin leche; dicho documento D1 tampoco tiene leche en su formulación. Por lo anterior, lo relacionado en la reivindicación 1 de la presente solicitud sobre el contenido de leche es bien sabido por cualquier persona que conozca del arte y D1 lo demuestra.

Ahora bien, un técnico medio conoce que una margarina por definición es una emulsión lo que conlleva al uso de emulsificantes; la proporción señalada por el solicitante es la que conoce cualquier técnico medio en la materia y también D1 lo enseña; los ejemplos lo señalan expresamente. Aún más, D1 señala expresamente el uso de lecitina, esteres de ácido cítrico y esteres de mono y di glicéridos los cuales señala también la presente solicitud.

Por todo lo anterior, se concluye que la propuesta del solicitante carece totalmente de los requisitos de patentabilidad porque lo que pretende reivindicar hace parte del conocimiento de un técnico medio en el arte propio de las margarinas.

De la misma forma, el documento D2 revela composiciones sin leche o con contenidos de leche inferiores a 1 %, elemento que es el que reivindica la actual solicitud. Nótese que la anterioridad también relaciona emulsificantes como los enseñados en las reivindicaciones estudiadas, en los intervalos que enseña la actual solicitud (0,25 – 1%) e incluyendo emulsificantes relacionados tales como lecitina, mono y di- glicéridos. En conclusión D2 también afecta de forma directa la actual solicitud.

D3 también enuncia composiciones de margarina sin leche y/o productos lácteos, e incluyendo emulsificantes en proporciones como las aquí reivindicadas. D3 afecta también de manera directa la patentabilidad de la presente solicitud.

D4 enuncia también margarinas libres de leche. Obsérvese que el problema de la coloración o pardeamiento planteado en la presente solicitud explícitamente es planteado y solucionado por D4 con la no inclusión de sólidos de leche; exactamente el mismo planteamiento hecho por la actual solicitud. Nótese que el uso de emulsificantes es necesario y deben venir contemplados dentro de la formulación.

De la misma forma existen decenas de documentos que relacionan lo mismo que el solicitante desea proteger, pero se ha considerado que estos cuatro documentos son representativos del conocimiento medio y suficientes para demostrar la falta de los requisitos de patentabilidad de la presente solicitud.

6. Conclusión:

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados así:

N°	Documento N°	Reivindicaciones afectadas	Requisito que afecta
D1	GB 1 404 651	1 - 7	Novedad
			Nivel Inventivo
D2	GB 1 341 964	1 - 7	Novedad
			Nivel Inventivo
D3	GB 1 254 191	1 - 7	Novedad
			Nivel Inventivo
D3	US 3 721 570	1 - 7	Novedad
			Nivel Inventivo

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de SESENTA días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.



Álix Carmenza Céspedes de Vergel
Directora de Nuevas Creaciones (C)

Concepto Técnico No. **2952**
Examinador Técnico **202003**
El anterior requerimiento fue notificado por fijación en lista, de fecha 22 SET. 2010

- (21) Application No. 33743/72 (22) Filed 20 July 1972
 (31) Convention Application No. 164 454 (32) Filed 20 July 1971 in
 (33) United States of America (US)
 (44) Complete Specification published 3 Sept. 1975
 (51) INT. CL. A23D 3/00
 (52) Index at acceptance
 CSC 9B1 9B2 9B4 9B5 9B6 9B7 9B8 9B9A 9B9B 9B9C1
 9B9CX 9B9D 9BX 9C3 9E2 9EX
 (72) Inventors LINO LUIGI LINTERIS
 JOHN DAVID MATTHEWS



(54) FOOD COMPOSITIONS

- (71) We, UNILEVER LIMITED, a company organised under the laws of Great Britain, of Unilever House, Blackfriars, London E.C.4, England, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:
- This invention relates to margarine and other plastic fat emulsion food spreads. Commercial margarines presently produced are used not only as spreads and as shortenings in the baking art, but also as frying fats. However, margarines as customarily manufactured having milk or the equivalent thereof as milk solids and water, skim milk, etc. at a milk solids level of about 1.4%-1.6%, when used for frying foods are prone to stick to the frying pan and to develop an unsightly burned or carbonised appearance. This undesirable appearance is evident not only in the heated margarine in the frying pan, but in the fried food.
- Although burning and discoloration are substantially absent in milk-free margarines, such margarines and other plastic emulsion spreads comprising a continuous fat phase in which a milk-free aqueous phase is dispersed, suffer from the defects of a lower overall salt sensation at the 1.5-2% salt level, a level that is normally adequate and therefore customary.
- By "salt sensation" is meant the taste resulting from the saline effect of sodium chloride on the gustatory receptors.
- The problem of reduced salt sensation at a 1.5-2% salt level in milk-free plastic emulsion spreads can be overcome by increasing the proportion of NaCl, but proportions of 3.5% to 5% would be required. Salt at this level tends to produce a bitter after-taste and may not be nutritionally desirable. In addition when the margarine spread is consumed in a melted state, as for example on hot foods, such as toast or potatoes, the taste at the higher salt concentration becomes objectionable.
- It has now been discovered that margarine with a milk-free aqueous phase can be prepared which has the advantage of a salt sensation equivalent to the level imparted by 2% sodium chloride in a margarine having milk as the aqueous phase, while also having the advantage that less burning or sticking occurs when the margarine is used for frying.
- The invention therefore provides a plastic fat emulsion food spread with an aqueous phase that is free from milk components but which does not suffer from a low level of salt sensation.
- Accordingly, the present invention provides a plastic fat emulsion food spread comprising a fatty continuous phase and milk-free (as hereinafter defined) aqueous disperse phase, the spread being flavoured with salt and containing sodium caseinate in an amount less than 0.1%, but sufficient to enhance the salt sensation of the spread.
- While it is not intended to limit the scope of the invention by the expression of any theory as to its mechanism of operation, it is believed that sodium caseinate potentiates salt taste in margarines with a milk-free aqueous phase by a mechanism which disrupts the emulsion to the extent required to release the salt ingredient. The emulsion may be much tighter in a conventional margarine, with a milk-free aqueous phase, which may prevent or retard the release of salt flavour in the mouth.
- This invention is particularly applicable to a plastic food product comprising at least 80% fat having emulsified therein not more than 20% of an aqueous phase, whole composition basis, and meeting the standards set forth, for example in the U.S. Standards of Identity of the Food and Drug Admini-

stration or the legislation identifying margarine.

In the use of the term "milk-free", sodium caseinate is not considered to be a component of milk, wherein the casein is not present as the sodium salt.

The margarines and other plastic emulsion food spreads of the present invention may optionally contain additives, such as citric acid, isopropyl citrate, stearyl citrate, calcium disodium ethylenediaminetetraacetate, monoglycerides, diglycerides, lecithin, vitamins, colorants, flavouring substances or potassium sorbate, where these are permissible.

The fat phase may contain any triglyceride oil permitted. Among the useful oils and fats there may be mentioned coconut oil, tallow, corn oil, safflower oil, butter oil, sunflower oil, soybean oil, and any rendered fat of cattle, sheep, swine, or goats, or stearine derived therefrom. The triglycerides will be carefully formulated with due regard to unsaturation, trans-acid content, molecular rearrangement, etc. to provide print or soft margarines having desired properties. The composition and character of the fat phase however is not critical to the invention and may be varied as required.

The fat phase of the margarine will constitute at least 80% of the total margarine emulsion. Margarines within the invention include those having a slightly higher fat content, for example about 85%. The fat content may be even higher, but a range of 80% to 85% allows sufficient water to dissolve comfortably an amount of salt in the aqueous phase which is appropriate to provide, along with 0.01% to 0.1% sodium caseinate, a salt taste which over the years has been accepted by margarine consumers.

The invention is also applicable however to emulsion food spreads containing a lower fat content. These are currently in vogue for their lower caloric content than conventional margarine. As little as 40% fat may be present in these low-fat spreads, a particularly suitable amount being about 65 wt % of the total composition.

The aqueous phase complements the fat phase in percentage level, and may range from 15% to 20% of the total of the fat and aqueous phases, in the margarines of the invention, and correspondingly up to 60 wt % for low-fat spreads.

The salt level is limited in the margarines of the present invention by consideration of bacteriological stability at the lower salt levels and dietary and taste reasons at the upper salt levels. The salt content of the margarines within the present invention preferably ranges between 1% and 3%. The preferred range is 1.7% to 2.5% salt. Less than 1.5% salt increases the danger of bac-

terial spoilage and further increases the danger of emulsion instability due to the greater proportion of sodium caseinate required to compensate for the lower salt level. A level of 4% salt can be used, although at this level the margarine has a bitter taste to some consumers, and this high level would be considered undesirable to some tastes.

The proportions of sodium caseinate range from 0.01% to 0.1%, and proportions within these limits will generally be employed in inverse order with respect to the proportions of salt. For example 0.01% sodium caseinate can be used with 3%-4% salt and 0.1% sodium caseinate used with 1%-2% salt. These relative proportions however are disclosed herein to serve only as guides, and it is contemplated that proportions of both sodium caseinate and salt will be selected within the disclosed limits to provide an improved salt sensation within the variable salt-taste levels acceptable among margarine consumers. Normally the proportions of sodium caseinate will range between 0.02% and 0.07%, a level of 0.03% being especially preferred in print margarines having no milk and having about 2% salt. The degree of hardness of the water used to make the margarine will influence the proportion of sodium caseinate to be used. Sodium caseinate is rendered insoluble by hardness ions, eg calcium and magnesium ions, and the harder the water, the more caseinate will be required. For example, at about 100 parts per million hardness as CaCO₃, proportions of sodium caseinate within the lower portion of the claimed range of 0.01% to 0.1% are adequate. At higher hardness levels, for example 250-300 parts per million the upper portion of this range may be used.

With reference to the process of preparing the margarines of the invention, the sodium caseinate is preferably incorporated into the aqueous phase, except for levels at and near 0.1%, at which the sodium caseinate is more readily incorporated in the fat phase.

The higher levels of sodium caseinate may also exert a destabilising influence on the emulsion stability of low-fat spreads in which therefore it may be desirable to use in conjunction with these quantities of sodium caseinate a correspondingly greater amount of the emulsifier which is normally present. Preferably however the amount of sodium caseinate present in low-fat spreads containing less than 65% fat is less than 0.05%.

Sodium caseinate may be prepared by methods well known in the art. In one procedure, skim milk is slowly acidified with dilute acetic acid under continuous stirring, avoiding heating above room tem-

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perature. By this step, casein is precipitated. The precipitated casein is separated from the aqueous acidic medium by filtration or by centrifugation. The liquid is discarded and the collected precipitate is dissolved in aqueous sodium hydroxide, avoiding an excess. Any precipitate remaining at this point is removed by filtration or centrifugation, and the sodium caseinate in solution is acidified with acetic acid to a pH of 4.7 to precipitate casein as a means of further purification. The precipitate is separated as described above and dissolved in aqueous sodium hydroxide to a pH of 7. The sodium caseinate is preferably recovered by drying *in vacuo* over a desiccant. The recovered dry sodium caseinate is powdered and extracted with anhydrous ether or petroleum ether to remove any remaining fatty substances. The sodium caseinate prepared as described is practically tasteless, and is devoid of any saline taste attributed to a product described in U.S. Patent No. 1,412,462, mentioned hereinafter, as a composition consisting of casein and an alkaline-earth hydroxide.

Suitable sodium caseinate preparations may also be made by methods described in U.S. Patent No. 3,266,904 and U.S. Patent No. 3,420,811.

The degree of salt sensation effected by the present invention is not limited to a specific level, but it is within the ambit of the invention to provide both soft and print tub spreads wherein the salt sensation may vary over a reasonable range within the variable limits of consumer acceptability. This is demonstrated in the following Examples, which are to be considered as not limitative, but as exemplary of the best mode of carrying out the instant invention. In the examples the Solid Fat Index values were calculated from dilatation measurements carried out in accordance with A.O.C.S. Tentative Method Cd-57 (1961), at the temperatures indicated.

EXAMPLE 1

An aqueous phase was prepared by adding to 17.4 parts of water having a hardness of about 100 ppm CaCO_3 , a premix consisting of 0.1 parts sodium benzoate, 0.0075 parts calcium disodium ethylenediaminetetraacetate, 2 parts of sodium chloride (margarine quality—low free copper salt), and 0.02 parts sodium caseinate. The aqueous phase was then pasteurized 20 minutes at 180°F and cooled to 50°F. A fatty phase was prepared in a margarine churn by combining a blend of hydrogenated and liquid cottonseed and soybean oils having a Solid Fat Index at 21.1°C of 11-15 and at 33.3°C of 1-5, with 0.2 parts monoglyceride emulsifier concentrate containing 45% monoglyceride, 0.2 parts lecithin, 65 colour (5,500 units/lb. beta-carotene), and

Vitamin A to provide 16,000 units/lb. and a suitable imitation butter flavour. The water phase was added to 80 parts of the oil phase in the churn while stirring so as to prepare a water-in-oil emulsion. The 70 emulsion in the churn at 94-100°F was quick-chilled with conventional scraped surface heat exchangers ("Votator" A units) and then printed by extrusion in block form and wrapped. "Votator" is a Registered 75 Trade Mark.

When a 30-member taste-preference panel compared the product with a similar but conventional margarine having milk as the aqueous phase, and containing no sodium 80 caseinate or disodium calcium ethylenediaminetetraacetate but otherwise prepared as above, which is well-known in the U.S. for its excellent taste, 16 members preferred the taste of the conventional margarine and 85 11 members preferred the taste of the milk-free margarine, three members detecting no difference. These figures indicate a slight overall preference for the taste of the conventional milk margarine, but also indicate 90 that the taste of the milk-free margarine is commercially acceptable in view of the fact that substantially as many panelists (14:16) considered that the milk-free margarine with 0.02% sodium caseinate was as good as or 95 better than the commercial product.

When the margarine prepared as above was stored along with the aforementioned commercial margarine for 11 weeks at 45°F, both products were considered to be equal 100 in flavour characteristics.

EXAMPLE 2

A margarine was prepared as described in Example 1 except that the sodium caseinate was incorporated at a level of 0.10% 105 and was slurried with twice its weight of the margarine oil blend of Example 1 and dispersed in the oil phase.

Twenty-two members of a 30-member taste panel considered that the product was saltier than the commercial milk margarine described in Example 1.

EXAMPLE 3

A margarine was prepared in accordance with Example 1 except that the proportion of sodium caseinate was 0.05% by weight 115 based on the whole margarine composition. This margarine, designated A, was compared with a control having a commercial formula with milk as the aqueous phase 120 but with no sodium caseinate and no disodium calcium ethylenediaminetetraacetate. This control margarine was designated B. The two margarines were compared for salt sensation, and for discoloration during the 125 frying of chicken, eggs, and potatoes and the preparation of a grilled cheese sandwich.

Salt Sensation:

Of a panel of 30 persons who evaluated 130

margarines A and B for salt sensation, 19 judged margarine A to be saltier, 9 judged margarine B to be saltier, and 2 attributed equal saltiness to both margarines.

5 When margarine A, containing no milk and 0.05% sodium caseinate was compared with a control margarine C, containing no milk and no sodium caseinate, all 30 panel members could detect a saltier taste for 10 margarine A, showing that the salt taste was contributed to by the sodium caseinate. *Fried Chicken—Southern Style:*

Chicken wings were coated with breading and fried in an electric frying pan, using 15 separate tests, margarines A and B as frying fats. During the first-stage browning step margarine B, containing milk, darkened considerably with charring, while the experimental margarine darkened very little. 20 After frying, the chicken pieces fried in experimental margarine A were much lighter in colour and more appetizing in appearance than pieces fried in the control having milk as the aqueous phase.

Fried Eggs:

Pan-fried eggs carefully fried over a gas flame in margarines A and B exhibited no difference in appearance. However in additional tests, when the gas flame was adjusted slightly higher than the minimum required for frying, the control margarine B 30 darkened and the eggs fried therein were discoloured and unappetizing in appearance, while the margarine A, having no milk and 0.05% sodium caseinate, did not darken, and the eggs fried therein were as light in colour as those fried under minimum heat conditions.

French-Fried Potatoes and Grilled Cheese Sandwiches:

No noticeable differences in the performances or colour was observed in margarines A and B when used to fry raw potato cubes over a medium gas flame for 20 minutes, or 45 when used to prepare a grilled cheese sandwich over a low gas flame.

EXAMPLE 4

A margarine was prepared as described in Example 1 except that the sodium caseinate was incorporated at a level of 0.01% 50 and the salt was incorporated at a level of 3%, both percentages being on the whole composition basis.

A margarine thus prepared was comparable to the margarine of Example 1 with respect to salt sensation and substantial freedom from darkening when used for frying foodstuffs.

EXAMPLE 5

Two batches of milk-free margarine were prepared following the direction provided in Example 1. One batch contained 0.03% by weight, whole composition basis, of sodium caseinate. The second batch contained 0.04% sodium caseinate but other-

wise had the composition of Example 1.

A 30-member taste preference panel in a test comparing the two aforementioned margarines with the conventional margarine described in Example 1, showed a slight 70 preference for the taste of the conventional margarine, 15 to 12 and 16 to 11 respectively, 3 members in each instance being unable to detect any difference. The taste of the two milk-free margarines was considered to be commercially acceptable, as attested by the high number, 15:15 and 14:16 respectively, who judged the aforementioned milk-free margarines to be equal to or better in taste than the commercial 80 milk margarine.

After storing 5 months at 45°F all three margarines were considered to be equivalent in taste, and within the limits of acceptability. 85

EXAMPLE 6

A margarine of the "tub" or soft type was prepared in the manner described in Example 1 except that the level of sodium caseinate was 0.03%, and the fat component was a blend of 85 parts of partially hydrogenated soybean oil and 15 parts of unhydrogenated cottonseed oil, the blend having an SFI_{12.5} of 6.5, an SFI_{15.5} of 1.8, and an SFI_{18.5} of 0. The emulsion, after leaving a "Votator" A unit in which it was chilled and worked, was run in a semi-fluid state at a temperature of 11°C to 13°C into 8-ounce containers and held at a temperature of about 7°C until firm. 100

This product was judged to be an improvement over a commercial soft margarine having milk solids in the aqueous phase with respect to discoloration and burning during frying. In a taste comparison by a 30-member panel, the milk-free soft margarine was judged to have acceptable organoleptic properties, and was considered saltier than the commercial soft margarine mentioned above by 13 out of 30 panel 105 members.

EXAMPLE 7

A soft margarine having the composition of the product of Example 6, except that the proportion of sodium caseinate was 0.04%, improved the salt sensation to a greater degree than that of the product of Example 6.

EXAMPLE 8

An oil blend was made up of 40 parts 120 interesterified palm oil, 30 parts hardened soybean oil of Iodine Value 100-110, 20 parts coconut oil and 10 parts unhardened soybean oil. The dilatation characteristics of this blend were $D_{25} 600 \pm 50$, $D_{35} 280 \pm 25$, $D_{45} 125 \pm 25$.

A batch premix consisting of 40 parts of the oil blend, 37 parts tap water of hardness 50 ppm CaCO_3 , 1.75 parts salt, 0.06 parts 10% citric acid aqueous solution, 0.05 parts 130

flavour, vitamin and colour additive, 0.2 parts monoglyceride emulsifier, and 0.02 parts sodium caseinate was agitated at fast speed (40 revs/min) for 30 minutes. 5 The water-in-oil emulsion was then fed to a conventional series of margarine process chilling and working units, comprising in series a worked precrystallising unit affording 2 minutes' residence time, two scraped-surface tube coolers, and a final stirred post-crystallising unit with no chilling, providing 3 minutes' residence time. Chilled emulsion was recirculated from the exit of the second chilling tube to join the fresh emulsion feed to the precrystallising unit. The total input to the process was 40 lbs per minute and the recirculating flow was 15 lb per minute. The final product was fed to a double-acting 20 reciprocating filling head where it was dosed into $\frac{1}{2}$ lb plastic tubs.

The low-calorie spread produced in this example spread easily from the fridge but did not show oiliness in appearance at 20°C.

A small panel of experienced tasters judged that the product prepared according to the above process and formulation gave a saltier impression in the mouth and had 30 a more pleasant flavour than one prepared in exactly the same way apart from the omission of the sodium caseinate in the formulation.

EXAMPLE 9

35 A low-fat spread was prepared as follows:—

A fat blend was prepared consisting of 85% hydrogenated soybean oil and 15% liquid cottonseed oil. The hydrogenated soybean oil consisted of a mixture of 20% hard stock at 62 Iodine Value (I.V.) and 80% soft stock at 115 I.V. The fat blend had the following characteristics:

45 *Dilatation*
 20°C 230 ± 30
 36°C 30 ± 1.5
 42°C 0

Solid Fat Index (SFI)
 50 21.1°C 6.5 ± 0.5
 33.3°C 1.6 ± 0.4

An oil phase and an aqueous phase were prepared having the following compositions. The figures shown are parts by weight based 55 on the whole spread composition.

	Parts by Weight
Oil Phase	
Fat blend identified above	38.8
Monoglyceride ^(a)	0.6
60 Lecithin	0.1

Colorant and Vitamins, q.s.

^(a) from 85 I.V. cottonseed oil. Contained about 45% monoglyceride, about 45% diglyceride, and about 10% triglyceride.

	Parts by Weight
Aqueous Phase	
Water	57.9
Salt	2.5
Potassium sorbate	0.1
Na ₂ Ca ethylenediaminetetraacetate	0.0075
Flavour	0.005
Sodium caseinate	0.0002

The oil phase and the aqueous phase were blended together and mixed to form a water-in-oil emulsion. The emulsion was then fed 75 to a series of conventional margarine process chilling and working units, cooled, and then run in a semi-fluid state into 8-ounce containers and held until firm.

For the purposes of comparison a similar 80 low-fat spread was prepared except that the proportion of water was 57.8 parts and sodium caseinate was absent.

The salt-taste enhancing effect of the sodium caseinate was found in tasting tests 85 to be marginal but definitely in evidence. This conclusion was also drawn from tests on a similar composition according to the invention which contained 0.002 parts of sodium caseinate. 90

WHAT WE CLAIM IS:

1. A plastic fat emulsion food spread comprising a fatty continuous phase and milk-free (as hereinbefore defined) aqueous disperse phase, the spread being flavoured 90 with salt and containing sodium caseinate in an amount less than 0.1% but sufficient to enhance the salt sensation of the spread.

2. A food spread in accordance with Claim 1 wherein said fatty continuous phase 95 constitutes from 80% to 85% by weight of said spread.

3. A food spread in accordance with Claim 1 wherein the said fatty continuous phase constitutes about 40% by weight of 100 said spread.

4. A food spread in accordance with any of the preceding claims wherein said spread is in print form.

5. A food spread in accordance with any 105 of the preceding claims wherein said spread is in soft tub form.

6. A food spread in accordance with any of the preceding claims wherein said spread contains between 1 and 3% salt. 110

7. A food spread as claimed in Claim 1, substantially as described with reference to the accompanying examples.

8. Food fried in spreads as claimed in any of the preceding claims. 115

9. A process for enhancing the salt sensation of margarine containing a milk-free (as hereinbefore defined) aqueous phase and flavoured with salt, comprising incorporating in said margarine during manufacture from 120 0.01% to 0.1% of sodium caseinate.

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PATENT SPECIFICATION

(11) 1341964

1341964

- (21) Application No. 6906/70 (22) Filed 12 Feb. 1970
(23) Complete Specification filed 11 May 1971
(44) Complete Specification published 28 Dec. 1973
(51) International Classification A23D 5/00
(52) Index at acceptance
C5C 9B4 9B5 9B7 9B8 9B9C1 9B9CX 9BX 9C1 9C2 9E2
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(54) IMPROVEMENTS IN OR RELATING TO EDIBLE EMULSIONS

(71) We, UNILEVER LIMITED, a company organised under the laws of Great Britain, of Unilever House, Blackfriars, London E.C.4, England, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to edible water-in-oil emulsions.

Edible emulsions based upon an aqueous dispersion in edible glycerides have long been known in the form of margarine and similar spreads closely resembling in their plastic characteristics the appearance and behaviour of butter at ambient temperatures. These plastic emulsion products also exhibit excellent stability and can be stored in their plastic condition for protracted periods without manifesting appreciable emulsion breakdown with the separation of the phases, or microbiological spoilage. Commonly these plastic food products contain milk solids or similar proteinaceous material introduced in the aqueous phase, in addition to fat-soluble emulsifiers favouring the formation of water-in-oil emulsions.

For many culinary purposes however it is more convenient to use such emulsion food products in liquid form, for example to disperse them more readily into baking compositions or for use directly in the kitchen or at the table. When however the normally plastic products are melted for this purpose the emulsion soon breaks down with the separation of oil and aqueous phases. It has therefore recently been proposed to provide a water-in-oil emulsion food product which while containing similar constituents to the plastic products remains pourable over the ambient temperature range. A pourable emulsion for this purpose should be regarded as one the dilatation value of whose oil phase at 20°C is 200 or less, based on the dilatation method described in our British patent specification No.

827,172. Thus the compositions proposed for these normally pourable products may include as great a fat content as the normally plastic products, but with less normally solid fat component—hereinafter termed stearin—and a greater complement of normally liquid oil—which may be termed the olein component—to provide the required mobility at ambient temperatures. Similarly the aqueous phase contains in the proposed formulations a proportion of milk solids.

It has been found however that the proposed formulations do not provide compositions which are at all comparable to normally plastic margarine compositions in resistance to microbiological deterioration at ambient temperature and in practice therefore it would be necessary to incorporate into the proposed compositions an effective proportion of a preservative, for example potassium sorbate. Many preservatives which might otherwise be effective are however unsuitable as they are contrary to the food laws applicable to margarine and similar compositions.

It has now been found that the resistance of pourable water-in-oil food products to microbiological deterioration can be improved by ensuring that they are substantially free from proteinaceous matter. The present invention therefore provides a water-in-oil emulsion food product which is pourable at ambient temperatures and which is substantially free from proteinaceous matter such products usually comprising an aqueous phase dispersed in the presence of an emulsifier in an oil phase comprising a major amount of normally liquid olein and a minor amount of normally solid stearin components, the product being substantially free from proteinaceous matter. In practice, any tendency for oil or aqueous phase to separate from the emulsion products of the invention can usually be counteracted by simply shaking or agitating the products of the invention. Emulsifying agents may be present in the products of the invention in

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amounts similar to those used in conventional margarines and the oil phase preferably similarly comprises a blend of a normally liquid oil comprising the olein component with a normally solid hard fat as the stearin component. The latter should of course be present in smaller amounts than are commonly present in plastic margarine, to confer adequate mobility to the product, but a small amount e.g. up to 10% of the stearin component in the total glyceride content appears necessary for sufficient emulsion stability. The total fat and oil content may be as high as, or indeed higher than that of conventional margarines. Both the olein and stearin components may be derived from vegetable or animal sources, the latter being usually at least partially hydrogenated. Suitable examples of vegetable oils include cottonseed, sunflower, safflower, corn, soya, palm and groundnut oils. Animal oils include for example, sardine, herring, pilchard and other fish oils and animal fats e.g. tallow and lard may be used for the stearin source. Preferably however the stearin component comprises fully hardened rapeseed oil or other source of C_{18} — C_{22} triglycerides.

The amount of stearin component in the total oil phase may be as little as 1% or even less. In general, the higher its melting point the smaller the amount needed for adequate emulsion stability. Preferably in the case of hardened rapeseed oil the amount used is from 1—7%, particularly 3—5%, and especially about 3%, and the oil is preferably fully hardened to an iodine value of not more than about 5, more preferably less than 3.

The amount of a given stearin which is incorporated in the total oil phase influences the viscosity and hence the pourability of the product, the viscosity increasing with the quantity of stearin present. In general, a viscosity of up to about 400—600 measured by Haake Viscometer at 20°C with a shear rate of 63 is satisfactory.

The olein component is preferably in part at least a liquid vegetable oil containing at least 40% polyunsaturated fatty acids, which are widely regarded as being dietetically beneficial.

The total oil phase, expressed as a percentage of the product is preferably at least 50%, more especially about 80—85%. In this specification all parts and percentages are by weight unless otherwise stated.

The emulsifying agents may comprise one or more non-proteinaceous emulsifiers, which favour the formation of water-in-oil emulsion, for example lecithin, lysolecithin, mono- and di-glycerides with long chain fatty acids, for example palmitic acid, and other fat-soluble emulsifiers. A combined emulsifier amount of 0.25—1% or more preferably 0.5—1% is often adequate. Lecithin

and a partial glyceride of a long-chain saturated C_{18} — C_{22} fatty acid provide a suitable combined emulsifier.

The composition may also contain flavouring, colouring matter and/or vitamin additives in addition to the amounts of salt which are customary in conventional margarine.

An important feature of a preferred form of the invention is the provision in the pourable emulsion of a dispersion of an inert gas throughout the emulsion, in an amount which may for example range from 0.5—20%, particularly 1—10% but preferably from 2—5%, all by volume. This added component further enhances the emulsion stability of the product and facilitates its production by a continuous method, besides improving the appearance of the product. It has been found that the aerated products of this invention may be prepared in a continuous fashion by a direct process eliminating the intermediate preparation of a plastic product.

Accordingly the aerated products of this invention are preferably prepared by a direct process comprising emulsifying an aqueous phase in a greater amount of a pourable oil phase and in the presence of emulsifier and the substantial absence of proteinaceous matter, the said oil phase comprising a minor amount of a normally solid stearin component together with a major amount of a normally liquid olein component, chilling the emulsion sufficiently to crystallise the higher-melting fractions of the blend in a scraped-surface heat exchanger and aerating the emulsion. Preferably the gas used is nitrogen but air or carbon dioxide, for example, may be used instead.

The gas injection may be effected into the emulsion at any stage of the process, but preferably is effected before the emulsion is chilled.

The optimum amount of gas required to improve the stability of a product prepared in accordance with the process of the invention varies according to the composition of the emulsion, but is usually from 1—10% by volume and more particularly from 2—5% by volume. Usually a too low gas concentration permits water separation as a bottom layer whereas with too much gas, oil separates to the surface of the emulsion.

The temperatures to which the emulsion is chilled in the process of the present invention may range for example from 5—10°C, as in conventional margarine manufacture. However the minimum temperature need be no less than about 5°C. In a particularly preferred arrangement the emulsion is processed through successive A and B "Votator" units to an emergent temperature of 17—18°C, and thereafter through a final A unit to an emergent temperature of 7—8°C. The residence time

in this final vessel need to be no more than about half a minute. "Votator" is a Registered Trade Mark.

Example.

- 5 A blend was prepared in a stirred premix tank maintained at 68°C. of the following ingredients in the percentages shown:—

	Sunflowerseed Oil	78.7
	Fully hardened rapeseed oil	
10	(IV less than 3)	3.02
	Monoglyceryl palmitate	0.41
	Lecithin	0.24

- 15 The lecithin was incorporated into the blend in the form of a 50% concentrate in sunflower oil.

To the melted premix blend was added a blend of flavouring additives and vitamins, as customary in margarine formulations, in an amount of 0.18%.

- 20 15.95% water and 1.5% salt were added to the contents of the premix tank in the form of a brine solution and emulsified in the oil phase. The temperature of the emulsion was then 50–52°C. Nitrogen was injected at 2.25

- 25 psig into the inlet of a positive displacement pump delivering 30 lb. per minute of the emulsion, to the first of a pair of "Votator" A units in series to which ammonia coolant was delivered at -9°C. The rate of nitrogen was adjusted to give from 3–5% nitrogen by volume in the final product.

- 30 The scraper rate in the units was maintained at 720 rpm. The chilled material emerged from the second of the A units at 35 13–14°C and was delivered to the first of a pair of B units in series, each fitted with rotators maintained at 200 rpm, in which further crystallisation took place.

- 40 From the second of the crystalliser units the material was delivered to a final chilling unit to which ammonia coolant was delivered at -11°C., and in which the rotor rate was

maintained at 150 rpm. The product from this further chilling unit emerged at a temperature of 7–8°C. It was then supplied via a filter screen to a filler unit maintained at 30 psig and liquid-filled at 6–7°C. into PVC bottles.

In all the chilling and crystallising units the residence time was no more than about 5 minutes.

The product showed excellent organoleptic properties, even after seven weeks storage at dairy cabinet temperatures and no trace of mould was detected in the bottled samples for at least 9 weeks' exposure to natural daylight. It was readily poured at temperatures from 5°C.

Comparative storage tests were carried out on samples of a product prepared as described in the example and a product which was otherwise similar but which contained milk solids. The samples were stored at from 5–20°C., in diffuse light, in bright light and in a cool cabinet, in stoppered, impact-modified clear and opaque bottles made of polyvinyl chloride, which in some cases contained stabiliser and ultra-violet absorbers. In some cases also the bottles were sleeved to afford further light protection.

In all more than 100 samples of the product according to the invention were tested and examined weekly for mould growth and by a tasting panel for organoleptic qualities. A trace of mould was detected in only one of these samples after 7 weeks. All the other non-milk samples were found to be palatable and with no trace of mould growth and little emulsion separation.

By contrast, extensive mould growth was apparent in most of the bottles of milk-containing samples after 4 weeks' storage. These tests were twice repeated, with similar results.

The compositions of the products tested are given in Table I.

TABLE I

Component	Product Composition %	
	Non-Milk	Milk
Sunflowerseed oil	79.4	78.24
Fully hardened rapeseed oil	2.45	2.42
Lecithin	0.24	0.24
MGP	0.41	0.41
Water	15.95	15.95
Milk	Nil	0.72
Sour solids		0.48
Salt	1.5	1.5
Flavouring	0.04	0.04
Total	99.99	100.00

MGP — Monoglyceride Palmitate.

WHAT WE CLAIM IS:—

1. A pourable water-in-oil emulsion food product substantially free from proteinaceous matter and containing an emulsifier.
2. A food product according to Claim 1 in which the oil phase constitutes from 80–85 weight percent of the product and comprises a blend of a major amount of a normally liquid glyceride oil and a minor amount of a normally solid fat.
3. A food product according to Claim 2 wherein the fat comprises a substantially completely hydrogenated oil or fat.
4. A food product according to Claim 3 in which the hydrogenated oil is a substantially fully hydrogenated rapeseed oil.
5. A food product according to Claim 4 in which the substantially fully hydrogenated rapeseed oil comprises from 3–5 weight percent of the product.
6. A food product according to any of the preceding claims wherein the oil phase comprises sunflower oil.
7. A food product according to any of the preceding claims which is aerated.
8. A food product according to Claim 7 containing from 2–5% inert gas by volume.
9. A food product according to any of the preceding claims which contains 0.25–1% of an emulsifier component.
10. A food product according to Claim 9 in which the emulsifier component comprises lecithin and a partial glyceride of a long-chain saturated C_{16} – C_{18} fatty acid.
11. A pourable, water-in-oil emulsion food product, substantially as hereinbefore described with reference to the accompanying example.
12. A method of preparing a pourable, water-in-oil emulsion food product comprising forming an emulsion substantially free from proteinaceous matter at elevated temperature of an aqueous phase in a greater amount of a pourable oil phase constituted by blending a minor amount of a normally solid fat with a major amount of a liquid glyceride oil in the presence of an emulsifier, chilling the emulsion to crystallise the higher-melting fractions of the blend in a scraped-surface heat exchanger and aerating the emulsion.
13. A process for the preparation of a pourable, water-in-oil emulsion food product substantially as described herein with reference to the foregoing examples.
14. Pourable, water-in-oil emulsion food products whenever prepared by the process claimed in Claim 12 or 13 which contain margarine-flavouring additives.

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Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1973.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

PATENT SPECIFICATION

(11) 1 254 191

1 254 191

- NO DRAWINGS
- (21) Application No. 12097/69 (22) Filed 7 March 1969
- (31) Convention Application No. P 16 92 541.0
- (32) Filed 7 March 1968 in
- (33) Germany (DD)
- (45) Complete Specification published 17 Nov. 1971
- (51) International Classification A 23 d 5/00
- (52) Index as accepted
- CSC 986 987 988 989C1 989D 9C4 9E2 9EX
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(54) SPREADABLE FATS

(71) We, UNILEVER LIMITED, a company registered under the laws of Great Britain, of Port Sunlight, Wirral, Cheshire, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to fat compositions. In particular the invention relates to fat compositions which are plastic and which contain or which may consist for their fat components substantially entirely of medium chain triglycerides. These may be defined as triglycerides of C_8 and C_{10} saturated fatty acids, in contrast to the acids predominating in fats, which are not only of greater chain length but are often also unsaturated.

The present invention provides a fat composition comprising a mixture of C_8 and C_{10} glycerides, including at least 45% tricaprin, by weight of the mixture of which at least 20% preferably at least 50% by weight of the mixture is in the β crystalline form.

In common with other glyceride fats, the medium chain triglycerides of the present invention can exist in three crystalline forms, α , β and β_1 . The majority of these triglycerides in the α and β_1 forms are liquid at room temperature, for example even β_1 tricaprin melts at 18°C. The β crystalline form of this component melts at 31.5°C. however and may therefore comprise part of a plastic fat composition.

A plastic fat composition is one which is spreadable at room temperature i.e. between 15 and 22°C. Spreadability has been evaluated with reference to hardness measurements by Haighon, (Fette, Seifen, Anstrichmittel, 65, 479-482, (1963)). According to this publication, hardness values below 100 g/cm² refer to a very soft unstable product, and above 1,500 g/cm² the product is too hard. The range 100-800 is preferred for good spreadability but 800-1500 is still acceptable.

The hardness measurements represent yield values determined by cone penetrometer as described in J.A. Oil C.S. 36, 349 (1959), usually with a cone weighing 80 g. with an angle of 40°C.

It is clearly necessary for spreadability to avoid the sharp melting characterising a pure compound and for this reason the compositions of the present invention contain at least one more C_8/C_{10} triglyceride in addition to tricaprin. Preferably the C_8/C_{10} mixture contains 45-95% tricaprin. In particular, the plastic fat compositions of the invention contain at least 80% tricaprin and monocapryldicaprin, and the major part of the β crystalline form of the fat is not greater than 20%. This ensures that, over the range specified, the fat is a plastic. The particle size requirement also avoids a sandy taste for the edible plastic compositions of the invention.

A characteristic property of C_8/C_{10} glycerides is that they are absorbed by a different metabolic mechanism from that involved in the case of higher glycerides and they may therefore be prescribed to patients whose normal fat metabolism is disturbed. The invention extends therefore to plastic edible spreads the fat content of which consists substantially entirely of the plastic C_8/C_{10} mixture, including margarine which may be spread in the normal manner. In addition, the invention includes emulsified spreads, for example margarine, in which part or all the customary range of higher fats is replaced by the plastic mixture of C_8 and C_{10} glycerides as hereinbefore defined. In particular, the invention includes margarine fat compositions in which the plastic fat comprising C_8 and C_{10} glycerides predominates and is blended with a minor proportion e.g. 5% of a vegetable oil the glycerides of which contain at least 40% polyunsaturated fatty acids. Margarine based on such compositions thus combines the dietetic advantage attributed to C_8/C_{10} fats with that of such highly unsaturated constituents, at the same time remaining

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spreadable and plastic at room temperatures, with 90% or more of the C_8/C_{10} fat.

The spreadability of the fat compositions of the invention which consist largely or solely of C_8 and C_{10} glycerides is surprising in view of the fact that hitherto fats with good spreadability have been characterised by comparatively flat dilatation curves whereas these compositions of the invention have substantially steeper dilatation curves because of the relatively few distinct chemical entities which they contain in comparison with natural fats such as coconut or cocoa butter fats. It was unexpected, therefore, that the C_8 and C_{10} glycerides alone could be obtained in a desirable consistency for spreading, even with higher melting points.

A further advantage of the compositions of the invention the fat content of which consists substantially wholly of C_8 and C_{10} glycerides is that being all saturated, these glycerides are substantially more resistant to oxidation than natural fats containing unsaturated acids e.g. oleic, linoleic and linolenic acids, while yet being obtained in plastic form. Where natural fats are hydrogenated sufficiently to stabilise the fat by removing centres of unsaturation, the product may commonly be too hard to be incorporated in spreadable products in more than limited amounts. The invention therefore includes natural fat compositions of which only part is replaced by the plastic compositions of C_8 and C_{10} glycerides. In this further function as additives to otherwise conventional fat compositions the C_8/C_{10} glycerides are preferably present to at least 15%. The compositions of which they form part may be intended for non-edible use, e.g. in creams, ointments, suppositories and other constituents and bases for cosmetic and pharmaceutical purposes.

Other compositions in which the mixtures of glycerides may be present include films for packing foils to reduce the adhesion between the packaging material and the packaged contents and to minimise water-permeability. They may also be present in solid soaps e.g. for phosphatides.

A particularly important application of the use as additives of the mixtures of C_8 and C_{10} glycerides according to the invention is however in edible fat compositions. C_8 and C_{10} glyceride fat compositions of the invention melt over a very narrow range, about 8 to 10°C; they thus confer a marked "cooling" effect on the tongue, even in contact with it at room temperature, because of the rapid removal of the heat of melting. The compositions are therefore, particularly suitable as additives, in relatively small amounts, to confer this effect on otherwise conventional edible fat products, e.g. margarine, filling for cream waters, and coating masses for baked goods. Preferably at least 15% of the additive is used, but 30% or more of the C_8/C_{10} solids may

be present in spreadable products. It has been observed, for example, that 15% added to a margarine imparts as much "cooling" effect as 30% of coconut oil, while giving better consistency and spreadability.

The amount of β crystalline form present in the mixture of C_8 and C_{10} glycerides is preferably at least 50%, to maintain good plasticity over a wide range. The β form is the most stable and has the highest melting point of the three crystalline forms. The β form is readily obtained by effecting supercooling of the molten mixture of C_8 and C_{10} glycerides, preferably to temperatures at least 12°C. and more especially at least 15°C. below the melting point of the mixture, and continuing crystallisation preferably at higher temperature. These may be reached by warming the mixture to e.g. 12 to 22°C. according to the composition of the fat.

Where the mixture of C_8 and C_{10} glycerides according to the invention is incorporated in foodstuffs, the mixture is preferably subjected to mechanical treatment to comminute a major part of the β form present to a particle size not greater than 20 μ and preferably below 15 μ . This further treatment, which may be carried out during crystallisation, ensures that sandiness in taste is avoided.

In the mixtures of C_8 and C_{10} glycerides according to the invention, excellent results have been obtained with weight values for C_8 : C_{10} fatty acids of (25 to 5) : (75 to 95) and more particularly from (15 to 5) : (85 to 95) and especially (13 to 10) : (87 to 90).

The C_8 : C_{10} composition may be made up of glycerides in the fat which contain in the same molecule other fatty acid residues. Thus in compositions in which at least 90% consists of the mixture of C_8 and C_{10} glycerides, the remainder may consist to a considerable extent of edible compositions of glycerides of polyunsaturated fatty acids, particularly linoleic acid, which may also contain C_8 and C_{10} acids in the same glyceride molecule. Preferably also the mixture contains at least 50% tricaprin and at least 80% and preferably more than 85% is tricaprin and monocapryldicaprin. The ratio of tricaprin to monocapryldicaprin is preferably (45 to 95) : (40 to 5). Preferably also, the combined content of tricaprin and monocapryldicaprin is kept to 20% at most, and preferably less than 15%.

In addition to the glycerides described, which are triglycerides, the compositions of the invention may also contain a proportion of C_8 and C_{10} diglycerides. The amount which may be present is not critical, but is preferably 0.5 to 20% and in particular is preferably 2 to 5% by weight, referred to the C_8 and C_{10} glycerides. Preferably the overwhelming proportion of diglyceride present is dicaprin. By contrast preferably edible compositions of the invention contain substantially no mono-

glycerides, since these have an undesirable taste effect and even in additive compositions the monoglyceride content should not exceed 0.1% of C_8 and C_{10} monoglycerides.

- 5 The invention may be more clearly understood by reference to the accompanying Examples.

EXAMPLE 1

10 963 g. of capric acid (99.5%) and 145 g. of caprylic acid (99.5%) were esterified with 188 g. of 99% glycerol (90% of theory) with the addition of 1.22 g. of caustic soda as catalyst. During the esterification, a pressure of 20–25 mm Hg was maintained, and the temperature of the mixture was initially 150°C.

15 and was raised gradually to 195°C. After 24 hours, the esterification was ended at an acid number of 20.8, and the product was deacidified with a 10% excess of 2 N caustic soda solution at 90°C, washed with water, and post-deacidified with 0.2 N caustic soda solution. The fat was washed to neutrality with hot water, dried for 30 min. at 95°C. in vacuum with stirring, and subsequently bleached with 5% of bleaching earth for 30 min. under the same conditions. The fat was filtered and heated with 30% of water for 6 hours at 180°C. and 5 mm Hg in a laboratory steamer.

20 In the final product (about 970 g.), monoglycerides could no longer be detected by thin-layer chromatography, and the content of diglycerides (by GLC) was 6%. The content of tricaprin was 55.6% and that of monocaprylodicaprin 31.5%. The remaining 6.9% consisted of 6.5% of dicaprylmonocaprin and 0.4% of tricaprylin. The acid number was 0.04. The melting point on heating was 23.5°C.

25 To make a margarine, after the addition of 0.2% of defatted alcohol-soluble soya phosphatide fraction and 0.2% of a mixture of mono- and diglycerides from hardened palm oil, 240 g. of this fat was melted at 37°C. and emulsified in the "Hobart" mixer (Hobart is a registered Trade Mark) with the aqueous phase, which consisted of 30 g. of skim milk soured by lactic acid fermentation and 30 g. of water. The emulsion was cooled to below +10°C. and stirred, whereupon the fat crystallised. After crystallisation was complete, the margarine was homogenised in a homogenising

machine (Gamm-Emulgor, setting 4) at about 18°C. three times, whereupon more than 50% of the β -crystals previously formed were brought to a crystal size of less than 10 μ , filled into containers, and stored at +15°C. for one day. The sample was then de-aerated and stored at +15°C. The margarine possessed good spreadability between +10° and +20°, and gave an extraordinarily strong cooling effect on melting on the tongue ($D_{10} - D_{15}$ of the fat: 1050, dilatation in mm²/25 g. according to Boekenoggen "Analysis and Characterisation of Oils, Fats and Fat Products" (1964), Vol. 1, p. 144).

EXAMPLE 2

A margarine the fat phase of which consisted of 95% of glycerides of C_8 and C_{10} fatty acids and 5% of sunflower seed oil was made in essentially the same manner as in Example 1. The fat composition was as follows:

Tricaprin	55.1%
Monocaprylodicaprin	28.3%
Dicaprylmonocaprin	5.8%
Tricaprylin	0.4%
C_8 and C_{10} diglycerides	5.4%
Sunflower seed oil	95.0%
	5.0%
	100.0%

The β phase content of the C_8/C_{10} mixture was more than 50%, and the particle size of the crystals was below 10 μ .

The margarine had similar desirable properties to the margarine prepared according to Example 1.

A series of trials was carried out on various fat compositions prepared and incorporated in an emulsion similar to those described in Example 1. The particulars of the compositions are set out in Table I, in which the hardness values are C values at 15°C. in g/cm² according to Haighton's publication. In all the trials the monoglyceride content of the samples was less than 0.1%.

TABLE I

	Composition Wt. %			M.Pt. °C.	Hardness @ 15°C.		Particle size μ After
	tricaprin	Tricaprin + Monocaprylo- dicaprin	Diglyceride		Before	After	
1	8.5	35.8	—	<0	—	—	—
2	45.1	61.1	3.0	19	470	<40	≤20
3	64.0	75	2.0	24.8	3500	180	≤50
4	59.4	82.2	3.0	24.5	>3000	950	≤20
5	95.4	96.8	0.1	28.8	>3000	2800*	≤50
6	100	100	0	30	>3000	—	≤50
7	55	76	19.5	20	—	—	≤20

* @ 22°C.

Comparing the emulsified products of these trials, the first was fully liquid. In trial 8 the product contained less than 80% tricaprin + monocaprylodicaprin in the fat phase but samples based on the fat before comminution could be spread, although some sandiness in taste was observed. The composition could be used, for example in ointments and creams for non-edible purposes.

As the total content of tricaprin and monocaprylodicaprin is increased, the product hardens, as shown by trial 3, so that after comminution it was satisfactory in a spreadable product. It was less satisfactory as an additive in about 15% to conventional margarine fats, although it was cool-tasting, because in comminuted form it was very soft at higher room temperatures. The comminuted product of trial 4 fulfils all the preferred requirements according to the invention for a fat suitable for use as the sole fat in a margarine fat or as an additive to conventional margarines. Margarines based solely on this product could be easily spread and showed no sandiness. A small amount of the comminuted product added to conventional margarine fat conferred remarkable coolness without sandiness.

The product of trial 5 contained too much tricaprin to be entirely satisfactory as the sole fat in margarine, and was not sufficiently soft at lower room temperatures. The hardness value was in fact measured at 22°C. because at 15°C. the fat was too hard for an accurate measurement to be made. Where as in trial 6 the product was solely tricaprin, the product was a crystalline powder which could not be

spread even at higher room temperatures, above which eventually it melted sharply. Trial 7 was carried out to illustrate the effect of high diglyceride content upon the product. The diglyceride content was prepared by interesterification of a mixture of C_8 and C_{10} triglycerides containing 65% tricaprin and 26% monocaprylodicaprin with 2% glycerol in the presence of sodium methoxide as catalyst. The interesterified mixture was washed with water to remove catalyst and dried. Although the melting points of diglycerides are higher than those of corresponding triglycerides, a high diglyceride content is seen in trial 7 to depress the melting point of the fat to the point where it is plastic only in the lower ranges of room temperatures.

WHAT WE CLAIM IS:—

1. Fat composition comprising a mixture of C_8 and C_{10} glycerides at least 20% by weight of which is in the β crystal form and including at least 45% tricaprin by weight of the mixture.
2. Fat composition according to Claim 1 wherein about 50% of the mixture is present in β crystal form.
3. Fat composition according to Claim 1 or 2 which comprises 45–95% tricaprin.
4. Fat composition according to any of the preceding claims wherein the ratio of the C_8 and C_{10} fatty acids in the mixture is (25 to 5): (75 to 95).
5. Fat composition according to any of the preceding claims wherein the C_8 to C_{10} ratio in the mixture is (13 to 10) : (87 to 90).
6. Fat composition according to any of the

- preceding claims wherein the ratio of tricaprin to monocaprylodicaprin is (45 to 95) : (40 to 5).
7. Fat composition according to any of the preceding claims wherein the mixture contains 0.5% to 20% of C_8 and C_{10} diglycerides.
8. Fat composition according to Claim 7 wherein the diglyceride content of the mixture is 2% to 5%.
9. Fat composition according to any of the preceding claims wherein the mixture is substantially free from C_8 and C_{10} monoglycerides.
10. Fat composition according to any of the preceding claims wherein at least 80% of the glycerides present in the mixture consist of tricaprin and monocaprylodicaprin, the particle size of the major part of the β crystal form is not greater than 20, and the tricaprin content is 45—95%.
11. Fat composition according to any of the preceding claims whereof at least 15% consists of the mixture of C_8 and C_{10} glycerides.
12. Edible plastic fat composition according to claims 10 and 11 suitable for use as the sole fat in the formulation of margarine fat, whereof at least 90% of the fat composition consists of the mixture of C_8 and C_{10} glycerides.
13. Edible fat composition according to any preceding claim which includes a fat component containing at least 40% polyunsaturated fatty acids.
14. A margarine fat according to Claim 13 wherein the additional fat comprises sunflower oil.
15. Process for the preparation of a plastic fat composition as claimed in any of the preceding claims comprising supercooling a molten mixture of C_8 and C_{10} glycerides comprising at least 45% tricaprin at least until crystallisation occurs and continuing crystallisation until a substantial proportion of the mixture crystallises in the β phase.
16. Process according to Claim 15 wherein the mixture is supercooled to a temperature at least 12°C. below its melting point.
18. Process according to claim 15 or 16 wherein a substantial part of the crystallisation is effected at a temperature significantly above the minimum at which the mixture is supercooled.
18. Process according to any of the preceding Claims 15, 16 or 17 wherein the product is subjected to mechanical treatment to comminute a major part of the β form present to a particle size not greater than 20 μ .
19. Process according to claim 15 for the preparation of a plastic fat composition substantially as hereinbefore described.
20. Fat compositions comprising a mixture of C_8 and C_{10} glycerides whenever prepared by a process claimed in any of the preceding claims 15—19.
21. Fat compositions according to claim 1 substantially as hereinbefore described with reference to the accompanying Examples.
22. Plastic, emulsified edible fat products whenever prepared from fat compositions as claimed in any of the preceding claims 1—19, 20 or 21.
23. Margarine comprising a plastic fat composition as claimed in claims 1—17, 20, 21 or 22.

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- [54] MILK-FREE MARGARINE
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[22] Filed: July 20, 1971
[21] Appl. No.: 164,454
[52] U.S. Cl.: 99/123, 99/122 R
[51] Int. Cl.: A23d 3/02
[58] Field of Search: 99/118 R, 122 R, 122 M, 123, 99/20

- [56] References Cited
UNITED STATES PATENTS
2,622,984 12/1952 Peebles et al.: 99/118 R X

3,420,811 1/1969 Van Wieren et al.: 99/20 X

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[57] ABSTRACT

Milk-free margarines, unlike margarines having milk solids in the aqueous phase, have little tendency to discolor when used for frying but have the undesirable attribute of a reduced salt sensation, and the reduction is counteracted by the presence of very small amounts of sodium caseinate.

5 Claims, No Drawings

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MILK-FREE MARGARINE

BACKGROUND OF THE INVENTION

1. Field of the Invention
Commercial margarines contemporarily produced are wholesome and nutritious, and are in demand as spreads and as shortenings in the baking art. Important among the uses of margarine is its use as a frying fat. However margarines as customarily manufactured having milk or the equivalent thereof as milk solids and water, skim milk, etc. at a milk solids level of about 1.4–1.6 percent, when used for frying foods are prone to stick to the frying pan and to develop an unsightly burned or carbonized appearance. This undesirable appearance is evident not only in the heated margarine in the frying pan, but in the fried food.

The aforementioned undesirable characteristics are eliminated when milk solids are removed from the margarine composition. At the present time Federal Standards of Identity permit the complete absence of milk solids in margarine, although a partial reduction is not permitted.

Although burning and discoloration are substantially absent in milk-free margarines, such margarines suffer from the defect of a lower over-all salt sensation at the 1.5–2 percent salt level, a level that is customary and adequate in most milk margarines.

The problem of reduced salt sensation at a 1.5–2 percent salt level in milk-free margarines can be overcome by increasing the percentage level of NaCl but levels of 3.5 to 5 percent would be required. Salt at this level tends to produce a bitter after-taste and may not be nutritionally desirable. In addition when the margarine is consumed in a melted state, as for example on hot foods, such as toast or potatoes, the taste at the higher salt concentrations becomes objectionable.

2. The Prior Art

The utility of sodium caseinate in milk-free margarine has not hitherto been recognized, and sodium caseinate is at the present time not included in the list of permissible additives in the Standards of Identity of the Food and Drug Administration.

Sodium caseinate has been disclosed as an emulsion disruptor in Dutch Patent No. 93,297, dated Jan. 15, 1960, abstracted in C.A. 55 6891e. However unlike in the instant invention, the described process relates to a complete breaking of an emulsion.

The utility of sodium caseinate in promoting a water-in-oil emulsion is described in C.A. 53 7454b.

U.S. Pat. No. 1,412,462, issued Apr. 11, 1922 discloses that calcium caseinate has a saline taste.

U.S. Pat. No. 3,266,904, issued Aug. 16, 1966 discloses a low-caloric spread which has not more than 60 percent fat, and contains 4–20 percent sodium caseinate added for its value as a protein component.

U.S. Pat. No. 3,314,798, which issued Apr. 18, 1967, relates to low-caloric spreads containing milk or cream. In these compositions the fat content ranges from 22 to 55 percent and the sodium caseinate from 0.75 to 1 percent.

The use of 1 to 3 percent alkali caseinate in an emulsion containing 10–50 percent fat with milk as the aqueous phase is disclosed in C.A. 62 4534b, (1965) referring to Netherlands Application 6,403,486, which issued Oct. 6, 1964.

3,721,570

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SUMMARY OF THE INVENTION

It has now been discovered that milk-free margarine can be prepared which has the advantage of a salt sensation equivalent to the level imparted by 2 percent sodium chloride in a margarine having milk as the aqueous phase, while also having the advantage that substantially no burning or sticking occurs when the margarine is used for frying.

By "salt sensation" is meant the organoleptic effect associated with the saline effect of sodium chloride on the gustatory receptors.

It is an object of the present invention to provide a milk-free margarine having an acceptable salt sensation and which is free from substantial burning and sticking in a frying operation.

It is another object of the invention to potentiate the salty taste in milk-free margarines to permit the use of salt levels no higher than normal therein for the purpose of providing an adequate salt sensation.

It is a further object of the invention to reduce the carbonization and discoloration of margarines when used as frying fats without adversely affecting salt sensation or flavor stability upon storage.

The objects of the invention are accomplished by incorporating very low levels of sodium caseinate in a milk-free margarine wherein water comprises the aqueous phase.

Accordingly the invention provides a margarine that is free from milk components, which does not suffer from a low level of salt sensation characteristic of milk-free margarines outside the instant invention.

The invention further provides a process for enhancing or potentiating the salt sensation of milk-free margarine which comprises incorporating in the margarine during manufacture from about 0.01 percent to about 0.1 percent of sodium caseinate.

It is believed that sodium caseinate potentiates salt taste in milk-free margarines by a mechanism which disrupts the emulsion to the extent required to release the salt ingredient. The emulsion is much tighter in a milk-free margarine, which prevents or retards the release of salt flavor in the mouth. The foregoing is a theory by which the inventor believes the objects of the instant invention are accomplished, but to which he has no wish to be held.

The term "margarine" as used herein refers to a plastic food product comprising at least 80 percent fat having emulsified thereon not more than 20 percent of an aqueous phase, whole composition basis, meeting the standards set forth in the Standards of Identity of the Food and Drug Administration. More particularly the term "margarine" as applied to the product of the instant invention refers to a product falling within that portion of the Standards wherein water is permitted as the aqueous phase.

In the use of the term "milk-free margarine," sodium caseinate is not considered to be a component of milk, wherein the casein is not present as the sodium salt.

The margarines of the present invention may optionally contain permissible additives, such as butter, salt, citric acid isopropyl citrate, stearyl citrate, calcium disodium ethylenediaminetetraacetate, monoglycerides, diglycerides, lecithin, vitamins, colorants, flavoring substances, potassium sorbate, etc.

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The fat phase may contain any triglyceride oil permitted in the Standards of Identity. Among the useful oils and fats there may be mentioned coconut oil, tallow, corn oil, safflower oil, sunflower oil, soybean oil, and any rendered fat of cattle, sheep, swine, or goats, or stearine derived therefrom. The triglycerides will be carefully formulated with due regard to unsaturation, trans-acid content, molecular rearrangement, etc. to provide print or soft margarines having desired properties. The composition and character of the fat phase however does not constitute an inventive aspect of the instant invention.

The fat phase of the margarine will constitute at least 80 percent of the total margarine emulsion. Margarines within the invention include those having a slightly higher fat content, for example about 85 percent. The fat content may be even higher, but a range of about 80 percent to about 85 percent allows sufficient water to dissolve comfortably an amount of salt in the aqueous phase which is appropriate to provide, along with about 0.01 percent to about 0.1 percent sodium caseinate, a salt taste which over the years has been accepted by margarine consumers.

The aqueous phase complements the fat phase in percentage level, and ranges from about 15 percent to about 20 percent of the total of the fat and aqueous phases.

The salt (NaCl) level is limited in the margarines of the instant invention by considerations of bacteriological stability at the lower salt levels and dietary and taste reasons at the upper salt levels. The salt content of the margarines within the present invention ranges between about 1 percent and about 3 percent. The preferred range is about 1.7 percent to about 2.5 percent salt. Less than about 1.5 percent salt increases the danger of bacterial spoilage and further increases the danger of emulsion instability due to the greater proportion of sodium caseinate required to compensate for the lower salt level. A level of 4 percent salt can be used, although at this level the margarine has a bitter taste to some consumers, and this high level would be undesired by persons who are conscious of their salt intake and who may rely upon the customary salt level of about 2 percent to judge their consumption of margarine. At the 4 percent level also there is likelihood of salt-crystal formation on storage.

The proportions of sodium caseinate range from about 0.01 percent to about 0.1 percent, and proportions within these limits will generally be employed in inverse order with respect to the proportions of salt. For example 0.01 percent sodium caseinate can be used with 3-4 percent salt and 0.1 percent sodium caseinate used with 1-2 percent salt. These relative proportions however are disclosed herein to serve only as guides, and it is contemplated that proportions of both sodium caseinate and salt will be selected within the disclosed limits to provide an improved salt sensation within the variable salt-taste levels acceptable among margarine consumers. Normally the proportions of sodium caseinate will range between about 0.02 percent and about 0.07 percent, a level of 0.03 percent being especially preferred in print margarines having no milk and having about 2 percent salt. The degree of hardness of the water used to make the margarine will influence the level of sodium caseinate to be

used. Sodium caseinate is insolubilized by hardness ions, e.g., calcium and magnesium ions, and the harder the water, the more caseinate will be required. For example at about 100 parts per million hardness as CaCO_3 , levels of sodium caseinate within the lower portion of the claimed range of about 0.01 percent to about 0.1 percent are adequate. At higher hardness levels, for example about 250-300 parts per million the upper portion of this range may be used.

With reference to the process of preparing the margarines of the invention, the sodium caseinate may be incorporated into the aqueous phase, except for levels at and near 0.1 percent, at which the sodium caseinate is more readily incorporated in the fat phase as set forth in Example 2, hereinafter.

Sodium caseinate may be prepared by methods well known in the art. In one procedure, skim milk is slowly acidified with dilute acetic acid under continuous stirring, avoiding heating above room temperature. By this step, casein is precipitated. The precipitated casein is separated from the aqueous acidic medium by filtration or by centrifugation. The liquid is discarded and the collected precipitate is dissolved in aqueous medium hydroxide, avoiding an excess. Any precipitate remaining at this point is removed by filtration or centrifugation, and the sodium caseinate in solution is acidified with acetic acid to a pH of 4.7 to precipitate casein as a means of further purification. The precipitate is separated as described above and dissolved in aqueous sodium hydroxide to a pH of 7. The sodium caseinate is recovered by any well-known means, preferably by drying in vacuo over a desiccant. The recovered dry sodium caseinate is powdered and extracted with anhydrous ether or petroleum ether to remove any remaining fatty substances. The sodium caseinate prepared as above is practically tasteless, and is devoid of any saline taste attributed to a product described in U.S. Pat. No. 1,412,462, mentioned hereinafter, as a composition consisting of casein and an alkaline earth hydroxide.

Suitable sodium caseinate preparations may also be made by methods described in U.S. Pat. No. 3,266,904 and U.S. Pat. No. 3,420,811.

The degree of salt sensation effected by the instant invention is not limited to a specific level, but it is within the ambit of the invention to provide both soft and print tub margarines wherein the salt sensation may vary over a reasonable range within the variable limits of consumer acceptability. This demonstrated in the following Examples, which are to be considered as not limitative, but as exemplary of the best mode of carrying out the instant invention.

EXAMPLE 1

To 17.4 parts of water, having a hardness of about 100 ppm as CaCO_3 , a premix consisting of 0.1 part sodium benzoate, 0.0075 parts calcium disodium ethylenediaminetetraacetate, 2 parts sodium chloride (margarine quality — low free copper salt) and 0.02 parts sodium caseinate is added and mixed. The aqueous phase is then pasteurized 20 minutes at 180° F and cooled to 50° F. The oil phase is prepared in a margarine churn by combining 80 parts margarine oil blend (a blend of hydrogenated and liquid cottonseed and soybean oils having an SFI₁₁₋₁₅ of 11-15; SFI₁₂₋₁₈ of 1-5)

monoglyceride concentrate (45 percent mono) 0.2 part, lecithin 0.2 part, color (5,500 units/lb. beta carotene), and vitamin A to provide 16,000 units/lb. and a suitable imitation butter flavor. The water phase is added to the oil phase in the churn while stirring so as to prepare a water-in-oil emulsion. The emulsion in the churn at 94°-100° F is quick-chilled with conventional scraped surface heat exchangers (Votator A units) and then extruded in stick form and wrapped.

When a 30-member taste-preference panel compares the product with a conventional margarine having milk as the aqueous phase, but containing no sodium caseinate and no disodium calcium ethylenediaminetetraacetate but otherwise prepared as above, sixteen members prefer the taste of the conventional margarine and 11 members prefer the taste of the milk-free margarine. Three members can detect no difference. These figures indicate a slight overall preference for the taste of the conventional milk margarine, but also indicate that the taste of the milk-free margarine is commercially acceptable in view of the fact that substantially as many panelists (14:16) consider that the milk-free margarine with 0.02 percent sodium caseinate is as good or better than the commercial product, which is one well-known for its excellent taste.

When the margarine prepared as above is stored along with the aforementioned commercial margarine for 11 weeks at 45° F, both products are considered to be equal in flavor characteristics.

The notation SFI with subscripts as used hereinabove and in Example 6 refers to the Solid Fat Index of the fat blend, calculated from dilatometer measurements as described in AOCS Tentative Method Cd-57 (1961). The subscripts are the temperatures in degrees centigrade at which the SFI values are obtained.

The 30-member taste-preference panel mentioned hereinabove is composed of Research personnel, employees of the instant assignee. About one-half of the panelists are experts in the tasting of margarine; all are selected for their acuity of judgement and their skill in determining taste differences and preference.

The panels mentioned hereinafter are composed of substantially the same personnel as the Example 1 panel except for an occasional substitution for reasons beyond the control of applicant.

EXAMPLE 2

A margarine is prepared as described in Example 1 except that the sodium caseinate is incorporated at a level of 0.10 percent, and is slurried with twice its weight of the margarine oil blend of Example 1 and dispersed in the oil phase.

Twenty-two members of a 30-member taste panel consider that the aforementioned product is saltier than the commercial milk margarine described in Example 1.

EXAMPLE 3

A margarine is prepared in accordance with Example 1 except that the proportion of sodium caseinate is 0.05 percent by weight based on the whole margarine composition. This margarine, designated as A, is compared with a control having a commercial formula with milk as the aqueous phase but with no sodium caseinate and

no disodium calcium ethylenediaminetetraacetate. This control margarine is designated B. The two margarines are compared for salt sensation, and for discoloration during the frying of chicken, eggs, and potatoes and the preparation of a grilled cheese sandwich.

Salt Sensation:

In a panel of 30 persons evaluating margarines A and B for salt sensation, 19 judge margarine A to be saltier, nine judge margarine B to be saltier, and two attribute equal saltiness to both margarines.

When margarine A, containing no milk and 0.05 percent sodium caseinate is compared with a control margarine C, containing no milk and no sodium caseinate, all 30 panel members can detect the saltier taste of margarine A, showing that the salt taste is contributed by the sodium caseinate.

Fried Chicken — Southern Style:

Chicken wings are coated with breading and fried in an electric frying pan, using in separate tests, margarines A and B as frying fats. During the first-stage browning step margarine B, containing milk, darkens considerably with charring, while the experimental margarine A darkens very little. After frying, the chicken pieces fried in experimental margarine A are much lighter in color and more appetizing in appearance than are the pieces fried in the control having milk as the aqueous phase.

Fried Eggs:

Pan-fried eggs carefully fried over a gas flame in margarines A and B exhibit no difference in appearance. However in additional tests, when the gas flame is adjusted slightly higher than the minimum required for frying, the control margarine B darkens and the eggs fried therein are discolored and unappetizing in appearance, while the margarine A, having no milk and 0.05 percent sodium caseinate, does not darken, and the eggs fried therein are as light in color as those fried under minimum heat conditions.

French-Fried Potatoes and Grilled Cheese Sandwiches:

No noticeable differences in the performances or color is observed in margarines A and B when used to fry raw potato cubes over a medium gas flame for 20 minutes, or when used to prepare a grilled cheese sandwich over a low gas flame.

EXAMPLE 4

A margarine is prepared as described in Example 1 except that the sodium caseinate is incorporated at a level of 0.01 percent and the salt is incorporated at a level of 3 percent, both percentages being on the whole composition basis.

A margarine thus prepared is comparable to the margarine of Example 1 with respect to salt sensation and substantial freedom from darkening when used for frying foodstuffs.

EXAMPLE 5

Two batches of milk-free margarine are prepared following the direction provided in Example 1. One batch contains 0.03 percent by weight, whole composition basis, of sodium caseinate. The second batch contains 0.04 percent sodium caseinate but otherwise has the composition of Example 1.

A 30-member taste preference panel in a test comparing the two aforementioned margarines with the conventional margarine described in Example 1, shows a slight preference for the taste of the conventional margarine, 15 to 12 and 16 to 11 respectively, three members in each instance being unable to detect any difference. The taste of the two milk-free margarines is considered to be commercially acceptable, as attested by the high number, 15:15 and 14:16 respectively who judge the aforementioned milk-free margarines to be equal or better in taste than the commercial milk margarine.

After storing 5 months at 45° F all three margarines are considered to be equivalent in taste, and within the limits of acceptability.

EXAMPLE 6

A margarine of the "tub" or soft type is prepared in the manner described in Example 1 except that the level of sodium caseinate is 0.03 percent, and the fat component is a blend of 85 parts of partially hydrogenated soybean oil and 15 parts of unhydrogenated cottonseed oil, the blend having an SFI_{20,1} of 6.5, an SFI_{30,1} of 1.8, and an SFI₄₀ of 0. The emulsion, after leaving the Votator A unit, is run in a semi-fluid state at a temperature of about 11° C to about 13° C into 8-ounce containers and held at a temperature of about 7° C until firm.

This product is judged to be an improvement over a commercial soft margarine having milk solids in the aqueous phase with respect to discoloration and burning during frying. In a taste comparison by a 30-member panel, the milk-free soft margarine is judged to have acceptable organoleptic properties, and considered more salty than the commercial soft margarine

mentioned above by 13 out of 30 panel members.

EXAMPLE 7

A soft margarine having the composition of the product of Example 6, except that the proportion of sodium caseinate is 0.04 percent, is within the instant invention. The higher proportion of sodium caseinate relative to that of Example 6 improves the salt sensation to a greater degree than that of the product of Example 6.

Having described the invention, modifications within the spirit thereof will be readily apparent to persons skilled in the art, and it is not intended that the invention be limited to the best modes exemplified but limited only within the scope and spirit of the appended claims.

What is claimed is:

1. A margarine comprising an emulsion of a fatty continuous phase and an aqueous disperse phase, said margarine containing from about 0.01 percent to about 0.1 percent sodium caseinate, about 1 percent to about 3 percent NaCl, and being free from milk components, said percentages being based on the whole margarine composition.
2. A margarine in accordance with claim 1 wherein said fatty continuous phase constitutes from 80 percent to about 85 percent by weight of said margarine.
3. A margarine in accordance with claim 1 wherein said margarine is in print form.
4. A margarine in accordance with claim 1 wherein said margarine is in soft tub form.
5. A process for enhancing the salt sensation of milk-free margarine, comprising incorporating in said margarine during manufacture from about 0.01 percent to about 0.1 percent of sodium caseinate.

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