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(54) Title: IMPROVEMENTS IN MARGARINE HARD STOCKS

(57) Abrégé/Abstract:
A non-hydrogenated margarine includes about 80% by weight, of a non-hydrogenated margarine oil/fat blend including about 16% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values of about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of about +/- 2% solids, in each case). Also included in the margarine is about 84% by weight of base stock vegetable oil, and, about 17.5% by weight, of an aqueous blend of whey and buttermilk.

TITLE

Improvements in Margarine Hard Stocks

ABSTRACT

A non-hydrogenated margarine includes about 80% by weight, of a non-hydrogenated margarine oil/fat blend including about 16% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values of about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of about +/- 2% solids, in each case). Also included in the margarine is about 84% by weight of base stock vegetable oil, and, about 17.5% by weight, of an aqueous blend of whey and buttermilk.

FIELD OF THE INVENTION:

The present invention relates to margarine hard stocks, and in particular to modified palm and palm kernel oil combinations in margarine hard stocks, and improved margarines including same.

BACKGROUND OF THE INVENTION:

The preponderance of many edible-emulsion formulations, such as margarines, are typically comprised of a "base stock" which is also typically a liquid or at least of a very soft consistency over the normal ambient range of room temperatures, (eg about 18 to 20 degrees C). Base stocks are often selected with their dietary characteristics in mind, and usually from oils (particularly of vegetable origin) which are rich in unsaturated fatty acid glycerides.

The use of unsaturates in products of this type is, in keeping with currently accepted medical thinking, believed to be of potential benefit to a consumer's health. High blood cholesterol is known to be a so called "contra-factor" in coronary heart disease epidemiology or etiology. Blood cholesterol comprises two main fractions, namely, low density lipoprotein cholesterol and high density lipoprotein cholesterol. Although the intake of saturated fats apparently has a relatively modest effect on levels of blood cholesterol levels as a whole, it has been reported that they do lead to a rise in low-density lipoprotein cholesterols levels. Moreover, low density lipoprotein cholesterol has been identified as the cholesterol fraction primarily connected with predisposition to coronary heart disease, so that the

significance of saturated fats intake is of greater significance than the mere overall increase in total blood cholesterol levels might, by itself, suggest. Low density lipoprotein cholesterol tends to accumulate along the interior lining of arteries and as a result predisposes an individual, in various ways, towards the potential for heart failure. This understanding has engendered a pattern of consumer avoidance of saturated fats in edible emulsions, and is reflected by consumers' desire for product alternatives that are relatively high in unsaturated fatty acids.

In addition to dietetic considerations, the base stock contributes certain mechanical properties to any blend of which it forms a part. Spreadability and mouth texture are largely effected by the amounts and the constitution of the base stock fats. Perhaps most important among the non-dietetic considerations relate to the spreadability and mouth feel properties of the product. The constituent fats must be low enough in solids: so that under whatever the normal range of ambient storage temperatures might be, they provide the desired spread-ability; and, so that under buccal-melting conditions, they provide a desired kinaesthetic profile, (the profile associated with butter is usually the standard employed in this connection). To this end, oils rich in unsaturated fats (such as linoleic and linolenic) have served the industry and consumers quite well. Safflower and sunflower oils are often employed in various base stock blends, for this purpose.

Ironically, however, polyunsaturated fats, in addition to reducing low-density lipoprotein levels in blood cholesterol and

providing useful dilatancy behaviour, concomitantly depress high-density lipoprotein cholesterol levels - and high-density lipoprotein cholesterol is now believed to be beneficial, if not necessary to good coronary health. Accordingly, some concerns have been raised over the suggestion that what polyunsaturates contribute on the one hand to coronary health, they detract on the other. Monounsaturated fats, such as those which are present in olive oil have come into their own, as a consequence of this desire to manage polyunsaturate levels in edible fat products. This however, necessarily effects the solids levels and melt characteristics of the final product.

These, and other considerations, are all factors in the selection of a base stock formulation.

Having decided, in any case, on a desired base stock fat formulation, the selected base stock is then blended with a relatively lower proportion of a "hard stock". The hard stock, as the name might suggest, contributes a thermo-mechanical structure that must provide a complementary match to the thermo-mechanical properties of the base stock - having regard both for the quantity and quality of the various constituent fat species of both stocks, so that the resulting blend is imbued with a character consistent with a desired degree of balanced plasticity.

This often necessitates the striking of a compromise between the various and somewhat divergent properties optimally associated, respectively, with packing, keeping and handling and perhaps most importantly, with consumption of the final product. Factors which

contribute to mouth texture are: cooling impact; mouth-melt; and, a mouth-feel that is sometimes referred to as "cleanup". Preferably, an emulsified spread provides a significant cooling impact, a rapid and sharply delineated melt sensation, without any pronounced residual coating or waxy feel on the tongue. Temperature cycling stability of the spread is also important when, during normal usage, spreads such as margarines are repeated taken in and out of the refrigerator and are thus exposed to a frequent cycle of warmer and colder temperatures. Also, during storage and shipment, the spread can be subjected to temperature variations. Such temperature cycling can materially affect the properties of the spread, especially mouth texture. As to handling properties, a preferred spread should be sufficiently plastic to be easily spread on soft foods such a breads. Heat stability in terms of slump resistance (loss of shape at the higher end of the normal storage temperature range) on exposure to summer room temperatures during normal product usage.

Fats typically employed in hard stock formulations are saturated fats having relatively higher melting points than fats which are employed in the base stock. Saturated fats, of course, are, in general, less than desirable from a health standpoint, and keeping the proportionate levels in spreads as low as possible is a significant consideration in arriving at a final formulation.

The problems associated with the use of saturated fats in general, has lead to a preference being shown in some quarters and in recent years for a return to the use of the so-called tropical oils (as

distinct from vegetable and animal oils), in margarine hard stock formulations. These tropical oils include, in particular, palm and/or palm kernel oils. Notwithstanding their desirability, however, the use of such palm and/or palm kernel oils, (as well as other tropical oils such as coconut and babassu oils), have not satisfied the needs of industry in meeting the complex demands that arise in achieving the balancing requirements implicit in the preceding paragraphs. More specifically, the native triglyceride compositions of these tropical oils predispose them towards brittleness at refrigerator temperatures, while at the same time having low melting points that interfere with spreadability and heat stability under the other conditions that margarines and the like are often exposed to.

Recourse has therefore been taken to "engineering" the tropical fat profile rather more directly than through simple fat selections and constituent proportioning. Techniques such as hydrogenation, interesterification, and fractionation have been variously employed in the interests of modifying the fat solids profiles of the hard stock constituents. This has been done in an attempt to achieve an effective balance in the final product, that will avoid the shortcomings associated with the native fats, as noted above.

Of these techniques, hydrogenation has fallen into disrepute, owing primarily to the fact that anything short of complete hydrogenation results in the production of trans-fatty acids isomers - and these have been linked with undesirable dietetic consequences from the coronary health perspective. Interesterification and fractionation, on the other

hand, are relatively expensive processes, and can be managed only if the proportionate amounts of the thus treated hard stock can be kept to reasonably low levels in the final product formulation. A whole raft of variations, refinements, combinations and permutations have been attempted, in the interests of satisfying the complex interplay of health/quality/cost factors that arise in this art.

The energy and monies invested in these prior efforts has led to an extremely crowded art that is in general terms, replete with less than satisfactory solutions to the myriad of interconnected problems facing the margarine industry, particularly in an increasingly health conscious marketplace.

Consider as a particular example of the problems outstanding in the art, the teachings contained in US 3,617,308, which in its various aspects, explore the application of interesterification coupled with hydrogenation, and includes a discussion of additionally including fractionation as part of a three way combination. The problems of the various combinations that were explored in US patent 3,617,308, are discussed in the context of a proposal that is disclosed at line 51 of column 1 of that patent. According to that patent, a hard stock had been proposed that consisted of a randomly interesterified, hardened (ie hydrogenated) palm kernel oil alone, or in admixture with a small proportion (eg about 10% by weight) of a hardened (ie also hydrogenated) palm oil.

Ultimately, US patent 3,617,308 patent teaches explicitly away from the use of fractionation altogether, and advocates instead a selected

combination of hydrogenation and interesterification, in the hope of overcoming the reported shortcomings of the other combinations considered therein.

SUMMARY OF THE INVENTION:

The applicants have found, and this finding in part forms a basis for the present invention, that notwithstanding the assertions of US patent 3,617,308 patent, and indeed surprisingly in view of them, a effective answer comes from combinations of non-hydrogenated palm and palm kernel oils that are fractionated and interesterified to meet the needs presently outstanding in the margarine and related arts.

Note that the move away from fractionation in order to keep the hydrogenation step - as is taught by US patent 3,617,308 patent, is in fact a problematic solution on a two fronts.

First of all - Hydrogenation has become a "watch-word" for consumers owing to a populist perspective borne out of warnings from the medical community to avoid trans-isomers that were associated with past commercial hydrogenation processes.

Moreover, hydrogenation, (even <u>complete</u> hydrogenation which reportedly avoids trans-isomer formation and hence the evils warned against by the medical community), is associated with:

a) mouth-melting properties which are flat or thick in character with a waxy or coated mouthfeel; and,

b) temperature impact on the tongue that does not provide a chilling sensation close to that of the butter standard,

(see in this latter connection, the specification of US patent 4,447,462, at column 2, in the paragraph beginning at line 58).

Accordingly, the present invention relates to a non-hydrogenated, tropical hardstock fat comprising a randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values as follows:

Temperature: degrees Centigrade	% Solids	Variance: +/- x%
5	70.49	2%
10	64.45	2%
20	49.83	2%
25	45.66	2%
30	34.13	2%
35	22.17	2%
40	10.90	2%

The above SFC profile was measured using AOCS Method CD 16-81. Alternate methodologies may yield different profiles for the same product. For example, the hard stock according to the present invention has an SFC profile according to IUPAC 6.2.2.2 method, as follows:

Temperature: degrees Centigrade	% Solids	Variance: +/- x%
5	84.50	2%
10	80.83	2%
20	59.18	2%
25	47.45	2%
30	34.92	2%
35	22.86	2%
40	11.43	2%

Accordingly, in the context of this patent specification, the SFC profile is recited as tested using the AOCS Method CD 16-81.

It is preferred that this hardstock fat consist of a co-randomized blend of the palm stearin and the palm kernel stearin.

In accordance with another aspect of the present invention, there are provided margarine oil blends comprising about 14 to 21.1% of the hardstock specified above, by weight of the margarine oil blend as a whole.

In one example of this latter aspect of the present invention, there is provided a non-hydrogenated margarine oil/fat blend comprising about 14.5 to 16% by weight of a non-hydrogenated, tropical hard stock

fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values as set forth above; and about 85.5 to 84% by weight of base stock vegetable oil.

This margarine oil/fat blend forms the fat phase that is used in the preparation of an aqueous emulsion, as a first stage in the production of margarines according to the present invention. To the melted oil/fat blend is added an aqueous phase comprising water, milk solids, salt, and such various preservatives as may be required. In accordance with the present invention, the aqueous phase preferably comprises a liquid whey containing about 1.4% milk solids. Optionally, the aqueous phase may be cultured and/or also contain liquid buttermilk. Salt and potassium sorbate can also be included.

In addition, vitamins A and D are preferably added to the mixture. Colour can be added as desired, through the addition of beta carotene in known manner.

Aqueous emulsions prepared in the course of producing margarines according to the present invention may further include an effective amount of an emulsification agent, such as mono-glycerides, diglycerides, and lecithin (especially soy bean lecithin) emulsifiers.

Margarines produced in accordance with the present invention are preferably constituted so as to be generally low in polyunsaturated fats, and relatively high in monounsaturated fats.

DETAILED DESCRIPTION OF THE INVENTION:

INTRODUCTION TO THE DRAWINGS:

Figure 1 of the appended drawings is graphical representation of the preferred solid fat content ("SFC") values for the non-hydrogenated, co-randomized hard stock fat blend of palm stearin and palm kernel stearin, according to the present invention; and, Figure 2 of the drawings is a schematic representation of a process according to the present invention.

EXAMPLE 1:

In accordance with a preferred embodiment according to the present invention, there is provided a non-hydrogenated margarine including:

- about 80% by weight, of a non-hydrogenated margarine oil/fat blend including about 16% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values of: about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of about +/- 2% solids, in each case); and, about 84% by weight of base stock vegetable oil; and,
- about 17.5% by weight, of a whey and buttermilk mixture

comprising about 1.4% milk solids.

This margarine has a ratio of monounsaturated fats to polyunsaturated fats is about 1 to 0.24, and more particularly, contains monounsaturate fats in an amount of about 55% by weight of the margarine, and unsaturated fats in an amount of about 13% by weight of the margarine.

The base stock vegetable oil comprises a blend of liquid olive oil; liquid canola oil; and liquid sunflower oil, in respective proportions of about 24%; about 23.5%; and, about 23.5%, all by weight of margarine.

EXAMPLE 2:

In accordance with an especially preferred embodiment according to the present invention, there is provided a non-hydrogenated margarine including:

- about 80% by weight, of a non-hydrogenated margarine oil/fat blend including about 14.5% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values of: about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of

about +/- 2% solids, in each case) ; and about 85.5% by weight of base stock vegetable oil; and,

- about 17.5% by weight, of liquid whey comprising about 1.4% milk solids.

This margarine has a ratio of monounsaturated fats to polyunsaturated fats is about 1 to 0.38, and more particularly, contains monounsaturate fats in an amount of about 55% by weight of the margarine, and unsaturated fats in an amount of about 13% by weight of the margarine.

The base stock vegetable oil comprises a blend of liquid olive oil; high oleic sunflower oil; liquid canola oil; and liquid sunflower oil, in respective proportions of about 20%; about 19.6%; about 18.8%; and, about 9.8%, all by weight of margarine.

In accordance with the present invention generally, the respective stearins of palm and palm kernel oils are prepared in known manner, blended in equal proportions in tank 1, and then co-randomly interesterified in reactor 2 using known interesterification methods, to produce a non-hydrogenated tropical hard stock fat. The hard stock is melted and then mixed with a vegetable oil base stock in mixer 3, in accordance with the specifications as set out above. This margarine fat blend forms a fat phase that is then mixed with an aqueous phase comprising either liquid whey (at about 1.4% milk solids); or, a cultured liquid whey alone; or, in combination with liquid buttermilk. Salt, soya lecithin, distilled monoglyceride, potassium sorbate,

optionally culture, beta carotene and vitamins A and D are also added. With the resulting emulsion at a temperature of about 49 degrees Centigrade, it is passed to a Votator-type A unit 4 where it is chilled, under mutator agitation (about 150 rpm being typical) for a residence time of about 1 minute, till it reaches a temperature of from about 16 to 26 degrees Centigrade.

The chilled emulsion exits the A unit 4, and is passed to a static B unit 5 where, following about 3 to 5 minutes residence, the heat of crystallization increases the temperature of the emulsion between about 10 to 15 degrees Centigrade. The product exits the static B unit 5, to be packaged and stored, typically at about 4.5 degrees Centigrade in packaging equipment 6.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A non-hydrogenated, tropical hardstock fat comprising a randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values of: about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of about +/- 2% solids, in each case).

2. The hard stock fat according to claim 1 where said hardstock fat is a co-randomized blend of said palm stearin and said palm kernel stearin.

3. A non-hydrogenated margarine oil/fat blend comprising about 14 to about 21.1% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values of: about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a

variance of about +/- 2% solids, in each case); and about 86 to about 78.9% by weight of base stock vegetable oil.

4. A non-hydrogenated margarine oil/fat blend comprising about 14.5 to 16% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values of: about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of about +/- 2% solids, in each case); and about 84 to 85.5% by weight of base stock vegetable oil.

5. A non-hydrogenated margarine including:

- about 80% by weight, of a non-hydrogenated margarine oil/fat blend including about 14.5 to 16% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values of about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees

Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of about +/- 2% solids, in each case); and about 84 to 85.5% by weight of base stock vegetable oil; and,

- about 17.5% by weight, of an aqueous blend of whey and buttermilk.

6. A non-hydrogenated margarine oil/fat blend comprising about 16% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values of: about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of about +/- 2% solids, in each case); and about 84% by weight of base stock vegetable oil.

7. A non-hydrogenated margarine including:

- about 80% by weight, of a non-hydrogenated margarine oil/fat blend including about 16% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content

("SFC") values of about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of about +/- 2% solids, in each case); and about 84% by weight of base stock vegetable oil; and,

- about 17.5% by weight, of an aqueous blend of whey and buttermilk.

8. The margarine according to claim 7, wherein said aqueous blend comprises a liquid whey containing about 1.4% mild solids, and liquid buttermilk.

9. The margarine according to claim 7 wherein the ratio of monounsaturated fats to polyunsaturated fats is about 1 to 0.24.

10. The margarine according to claim 9 wherein said monounsaturate fats comprise about 55% by weight of said margarine, and said polyunsaturated fats comprise about 13% by weight of said margarine.

11. The margarine according to claims 10 wherein said margarine oil/fat blend comprises liquid olive oil; liquid canola oil; and liquid sunflower oil.

12. The margarine according to claim 11 wherein said olive oil comprises about 24% by weight of said margarine; said canola oil comprises about 23.5% by weight of said margarine; and, said sunflower oil comprises about 23.5% by weight of said margarine.

13. The margarine according to claim 11, further including an effective amount of an emulsifier.

14. A non-hydrogenated margarine oil/fat blend comprising about 14.5% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm stearin and palm kernel stearin, having solid fat content ("SFC") values of: about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of about +/- 2% solids, in each case); and about 85.5% by weight of base stock vegetable oil.

15. A non-hydrogenated margarine including:

- about 80% by weight, of a non-hydrogenated margarine oil/fat blend including about 14.5% by weight of a non-hydrogenated, tropical hard stock fat comprising a co-randomly interesterified blend of generally equal proportions of palm

stearin and palm kernel stearin, having solid fat content ("SFC") values of about 70.49% solids @ 5 degrees Centigrade; about 64.45% solids @ 10 degrees Centigrade; about 49.83% solids @ 20 degrees Centigrade; about 45.66% solids @ 25 degrees Centigrade; about 34.13% solids @ 30 degrees Centigrade; about 22.17% solids @ 35 degrees Centigrade; and about 10.9% solids @ 40 degrees Centigrade (with a variance of about +/- 2% solids, in each case); and about 85.5% by weight of base stock vegetable oil; and,

- about 17.5% by weight, of an aqueous blend of whey and buttermilk.

16. The margarine according to claim 15, wherein said aqueous blend comprises a liquid whey containing about 1.4% milk solids.

17. The margarine according to claim 15 wherein the ratio of monounsaturated fats to polyunsaturated fats is about 1 to 0.38.

18. The margarine according to claim 17 wherein said monounsaturate fats comprise about 60% by weight of said margarine, and said polyunsaturated fats comprise about 22.5% by weight of said margarine.

19. The margarine according to claims 17 wherein said margarine oil/fat blend comprises liquid olive oil; liquid high oleic sunflower oil; liquid canola oil; and liquid sunflower oil.

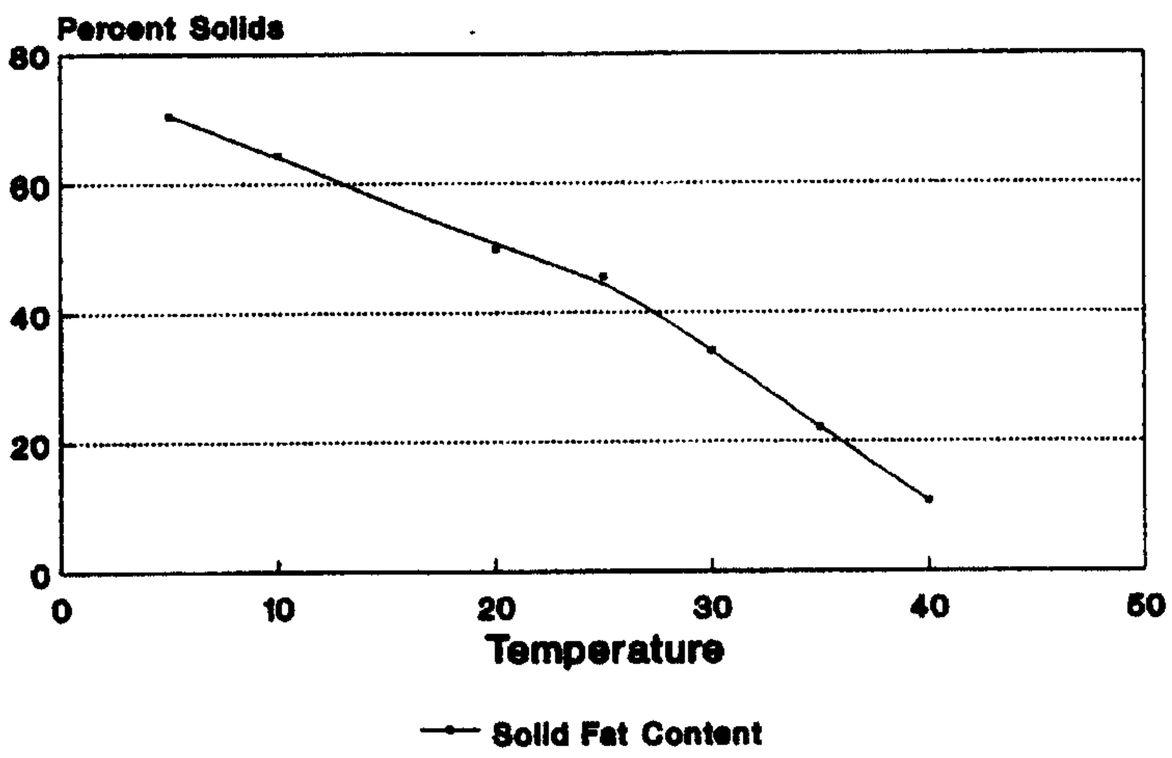
20. The margarine according to claim 19 wherein said olive oil comprises about 20% by weight of said margarine; said liquid high oleic sunflower oil comprises about 19.6% by weight of said margarine; said canola oil comprises about 18.8% by weight of said margarine; and, said sunflower oil comprises about 9.8% by weight of said margarine.

21. The margarine according to claim 19, further including an effective amount of an emulsifier.

JAMES W KERR

PATENT AGENT

FOR THE APPLICANT


Percent Solids
80
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40
20
0
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10
20
30
40
50
Temperature
Solid Fat Content

Fig.1

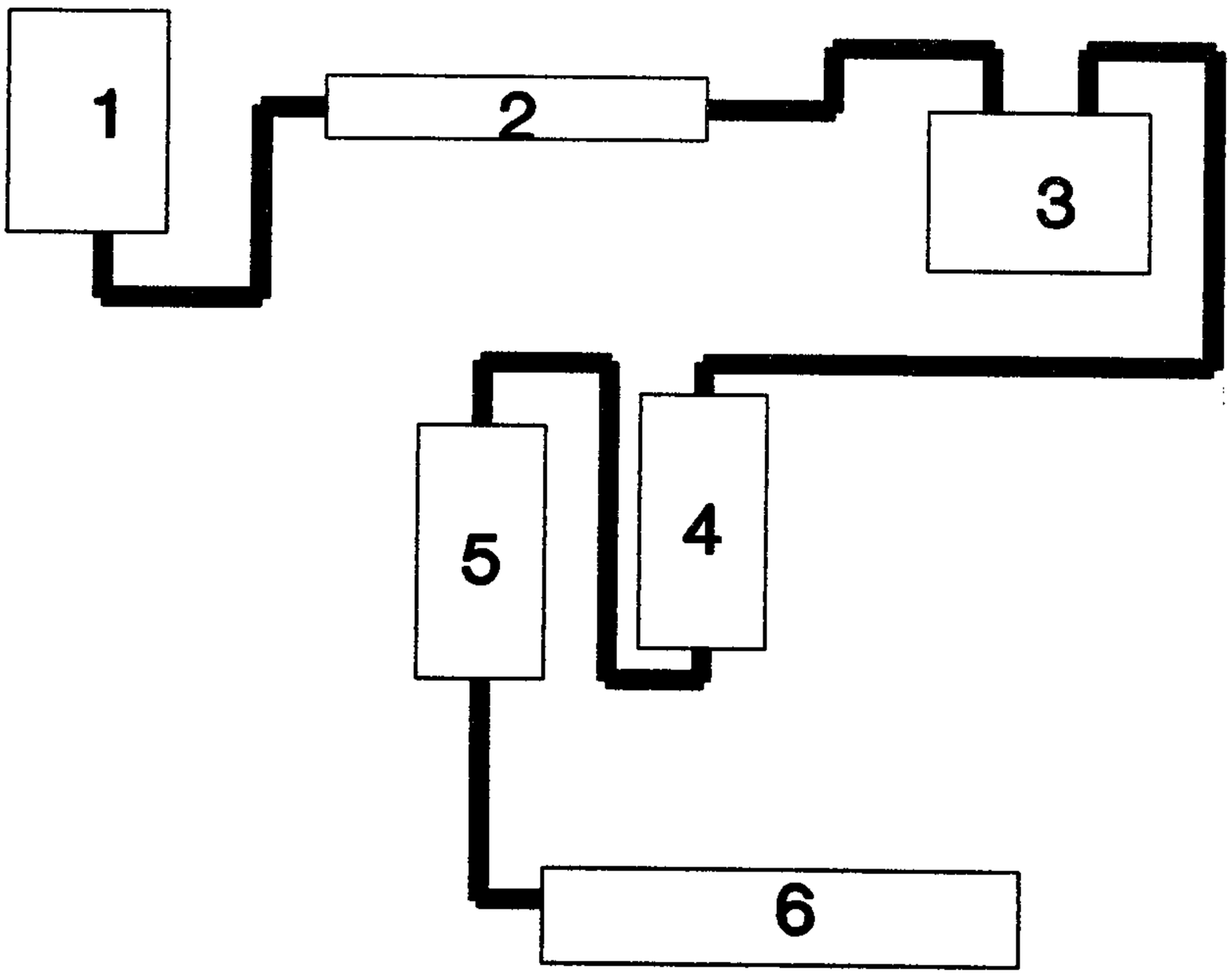

Fig.2