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FAT COMPOSITION FOR MARGARINE AND OTHER PURPOSES

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This invention is directed to oil compositions, more particularly to those containing coconut oil reaction products and having desirable characteristics for margarine and similar products. The present application is a continuation-in-part of copending application Serial No. 365,535, filed July 1, 1953, entitled "Fat Composition for Margarine and Other Purposes," now abandoned.

Attempts have been made to use coconut oil in conjunction with other oils in making margarine. The use of coconut oil has disadvantages and up to the present time not over about 25% of coconut oil could be incorporated in the remainder of the oils used without detriment to the quality of the margarine. Where higher percentages of coconut oil were incorporated in the formula, the resulting product became hard and brittle at refrigerator temperatures; also at summer temperatures the margarine became too soft.

The present invention is intended and adapted to overcome the difficulties inherent in the use of coconut oil in large amounts in oil compositions incorporated in margarine, it being among the objects of the present invention to modify the coconut oil so as to render the resulting margarine superior to ordinary margarines on the market.

It is also among the objects of the present invention to provide a modified coconut oil composition which will impart desirable characteristics to the resulting margarine in improved flavor and wider plastic range.

It is further among the objects of the present invention to provide a margarine oil composition containing modified coconut oil which not only is not brittle at low temperatures but remains firm at ordinary room and summer temperatures while at the same time imparting good taste, color, odor and keeping qualities to the margarine.

In practicing the present invention a coconut type oil is used, namely, one consisting of the mixed glycerides of fatty acids having from 6 to 18 carbon atoms. Such an oil is modified by the use of one or more short chain fatty acid triglycerides, which are interesterified with the coconut oil, said glycerides having from 6 to 10 carbon atoms. It is desirable and preferable to utilize mixed triglycerides of fatty acids having 8 and 10 carbon atoms as giving excellent results. Depending on the amount and character of the short chain fatty glycerides used, the melting point can be controlled. The coconut type oil used may be hydrogenated. There is further interesterified with the so modified coconut oil minor amounts of the triglycerides of long chain fatty acids having 16 and 18 carbon atoms, such as stearic acid.

Another method of modifying the coconut type oil consists in mixing said oil with suitable amounts of tristearin and the short chain fatty acid glycerides and interesterifying all of the constituents simultaneously. By controlling the proportions of the three constituents, any desired melting point range may be obtained.

The end products may be used by themselves in margarine or may be physically blended with hydrogenated oils such as soya bean, cottonseed and the like to give margarine having good taste, odor and long shelf life without rancidity. There may be physically added 1–15% of triglycerides of palmitic and stearic acids.

The coconut type oil may be mixed with the short chain fatty acid triglyceride and a long chain fatty acid glyceride oil and the mixture interesterified. The product may then be hydrogenated until the desired melting point is obtained. Instead of the triglycerides of said long and short chain acids the acids themselves together with the necessary amount of glycerine may be used.

Still another method of modifying the coconut type oil consists in blending said oil with another oil, such as peanut, cottonseed, corn or soya, together with the triglycerides of short chain fatty acids. The mixture is then hydrogenated to a melting point from 5° to 10° C. higher than that desired in the final margarine oil. Thereafter the mixture is interesterified to give the final product.

By the above methods modified coconut type oils are obtained which may be used by themselves as the total fat content of the margarine or in conjunction with other hydrogenated oils. When a mixture is used, the modified coconut type oil constitutes at least 25%–30% of the oil mixture. The resulting margarines have extremely low iodine numbers, which is quite different from the ordinary margarines now on the market, which have an iodine value of about 60 to 75, whereas those made in accordance with the present invention have iodine values from about 5 to 30 and generally less than 15. When the starting material is hydrogenated coconut oil having a melting point of about 100° F., the iodine value may be as low as 1. In spite of the low iodine values, the present products are not waxy, nor do they become brittle at refrigerator temperatures. On the other hand, they have an excellent flavor and odor and are quite stable in storage, being highly resistant to rancidity.

The short chain fatty acid triglyceride used may be varied over a considerable range. In general, the amount of such glyceride which is interesterified with the coconut type oil is usually from about 5% to 30%, preferably from 5% to 15%. The amount of long chain fatty acid glyceride is from about 5% to 25% based on the coconut oil used, and preferably about 10% to 20%.

It is necessary that in the final product a direct relationship exist between the lower, intermediate and higher fatty acids present. The capric and caprylic acids are from about 10 to 25%, the lauric and myristic acids from about 25% to 65%, and the palmitic and stearic acids from about 15% to 60%. Preferably the capric and caprylic acids are from 15% to 25%, the lauric and myristic acids from about 45% to 60%, and the palmitic and stearic acids from about 20–40%. The presence of some unsaturated higher fatty acids is considered desirable, and usually 2% to 10% of linoleic is present in the oil.

Together with the above proportions the physical properties of the product preferably fall within certain limits as follows:

Wiley, M.P., ° F.	88–98
Setting point, ° C.	22–25
Penetration (35° F.)	15–25
Penetration (70° F.)	40–50

The outside limits for an acceptable margarine oil are as follows:

Wiley, M.P., ° F.	88–105
Setting point, ° C.	20–28
Penetration (35° F.)	15–30
Penetration (70° F.)	35–70

In the production of margarine the following composition by weight is provided:

	Percent by weight
Fat	80.3
Glycerol monostearate	1.25
Lecithin	1.25

	Percent by weight
Color	1.25
Milk	17.35
Salt	1.60

The oil is introduced into the mixing vessel and creamed to 140° F. There is then added the coloring matter, emulsifier, vitamins, and the lecithin thereto with agitation until a smooth homogeneous oil results. The oil is then allowed to cool to a temperature of 125° F. While the oil is cooling, the required amount of milk and salt are stirred together and then added to the oil. Stirring is continued while the oil is drawn through the chill roll, flaked off into thin sheets and then churned through the complector and extruded as the finished margarine.

The modified oils of the present invention which are incorporated in the margarine are illustrated by the following examples.

Example 1

The following mixture is provided in a suitable reaction vessel.

	Lbs.
Hydrogenated coconut oil (M.P. 100° F.)	404
Cottonseed stearine	50
Mixed lower fatty acid triglycerides	51
Sodium methylate	1.5

The oils are first dried under a vacuum at about 75° C., the catalyst is added and a temperature of 50° to 60° C. is maintained for about 1½ to 2 hours to complete the interesterification. The lower fatty acids of the triglycerides have the following composition.

	Percent
Caprylic acid	80
Capric acid	15
Caproic and lauric acids	5

The proportions of the acids present are about 22% capric and caprylic, 53% of lauric and myristic, and 25% of palmitic and stearic. The Wiley M.P. is 89.7° F., the setting point is 24° C., the penetration at 35° F. is 16 and at 70° F. is 40.

The interesterified fat after refining is then made into margarine by the method described above. The product is extremely stable, has an excellent flavor, does not become brittle in the refrigerator and does not unduly soften when exposed to summer temperatures.

Example 2

The following composition is provided:

	Gms.
Hydrogenated coconut oil (M.P. 100° F.)	930
Triglyceride of mixed caprylic and capric acids	70
8.4% $NaOCH_3$ in xylene	37

The oils are dried at 80° C. under a high vacuum and the catalyst is added. The mixture is heated for 1½ hours at a temperature of 55° to 66° C. to complete the interesterification. The product is washed with water until neutral, then dried and bleached in a vacuum. It is deodorized with steam. The product has a Wiley M.P. of 88.4° F., a softening point of 87° F., and a setting point of 23.6° C. It has a penetration at 35° F. of 18, and at 70° F. of 45.

The composition of the acids present is about 21% of capric and caprylic acids, 61% of lauric and myristic acids, and 18% of palmitic and stearic acids.

Example 3

The following mixture of oils is used:

	Percent
Hydrogenated peanut oil	5
Hydrogenated cottonseed oil	70
Hydrogenated coconut oil	25

It is mixed in the proportion of 33% by weight with 67% by weight of the product of Example 2 and interesterified.

The acids present are about 15% of capric and caprylic, 47% of lauric and myristic, and 38% of palmitic, stearic, oleic and linoleic acids. The product has a Wiley M.P. of 90.2° F., a setting point of 22.5° C., a penetration at 35° F. of 23 and a penetration at 70° F. of 47.

Example 4

The following mixture is provided:

50% hydrogenated peanut oil (92° F.)
50% of Example 1

Interesterification takes place under the usual conditions and the resulting product has a melting point of 92.4° F. with a softening point of 78.5° F.

The proportions of the acids are about 11% of capric and caprylic acids, 26% of lauric and myristic acids, and 59% of palmitic, stearic, oleic and linoleic acids. The product has a Wiley M.P. of 92.4° F., a setting point of 23.0° C., a penetration at 35° F. of 21 and a penetration at 70° F. of 45.

Example 5

A mixture of the following constituents is made in parts by weight:

Coconut oil (refined)	800
Cottonseed stearin	200
Mixed capric and caprylic triglycerides	100
Na methylate (8.4 parts) in xylene	40

The oils are dried under a high vacuum at 80° C. and interesterified for 1½ hours at 60° C. The product is washed with water until it is neutral, then dried and bleached under vacuum. The melting point is 94.1° F. and the softening point is 91.7° F.

There is physically blended therewith 90 parts of tripalmitin. The composition is mixed with the usual components to produce an excellent finished margarine for table use.

Example 6

A mixture is made of 83% palm kernel oil and 17% of the triglycerides of the following fatty acids:

	Percent
Caprylic	70
Capric	28
Lauric	1.2
Caproic	0.8

To this mixture there is added 10% of cottonseed stearin and the reaction is conducted as in Example 1. To the refined and bleached product is added 4% of palm stearin.

The products made from the above examples may also be used for inedible purposes, such as lubricants, ointments, carriers and vehicles for medicinal preparations, etc. There may be present in the products up to about 1% of caproic acid based upon the total acids therein. Instead of triglycerides used in the interesterification, the constituents of the triglycerides may be used. Other coconut type oils may be used, such as babassu, palm kernel, oiticica, and others.

I claim.

1. A fat composition for incorporation in margarine comprising a coconut type oil interesterified with the triglycerides of fatty acids having 8, 10, 16 and 18 carbon atoms, the relative proportions of the acids in said interesterified oil being about 10–25% of capric and caprylic, about 25–65% of lauric and myristic, and about 15–60% of palmitic and stearic, the product having a setting point of about 20°–28° C., a Wiley melting point of 88°–108° F., and a penetration at 70 °F. of about 35–70.

2. A fat composition for incorporation in margarine comprising a coconut type oil interesterified with the triglycerides of fatty acids having 8, 10, 16 and 18 carbon atoms, the relative proportions of the acids in said interesterified oil being about 10–25% of capric and caprylic, about 25–65% of lauric and myristic, and about 15–60%

of palmitic and stearic, the product having a setting point of about 20°–28° C., a Wiley melting point of about 88°–105° F., a penetration at 35° F. of about 15–30, and a penetration at 70° F. of about 35–70.

3. A fat composition for incorporation in margarine comprising a coconut type oil interesterified with the triglycerides of fatty acids having 8, 10, 16 and 18 carbon atoms, the relative proportions of the acids in said interesterified oil being about 15–25% of capric and caprylic, about 45–60% of lauric and myristic, and about 20–40% of palmitic and stearic, the product having a setting point of about 22°–25° C., a Wiley melting point of 88°–98° F., and a penetration at 70° F. of about 40–50.

4. A fat composition for incorporation in margarine comprising a coconut type oil interesterified with the triglycerides of fatty acids having 8, 10, 16 and 18 carbon atoms, the relative proportions of the acids in said interesterified oil being about 15–25% of capric and caprylic, about 45–60% of lauric and myristic, and about 20–40% of palmitic and stearic, the product having a setting point of about 22°–25° C., a Wiley melting point of about 88°–98° F., a penetration at 35° F. of about 15–25, and a penetration at 70° F. of about 40–50.

5. A fat composition for incorporation in margarine comprising a coconut type oil interesterified with the triglycerides of fatty acids having 8, 10, 16 and 18 carbon atoms, the relative proportions of the acids in said interesterified oil being about 22% of capric and caprylic, about 53% of lauric and myristic, and about 25% of palmitic and stearic, the product having a setting point of about 24° C., a Wiley melting point of 89°–90° F., and a penetration at 70° F. of about 40.

6. A fat composition for incorporation in margarine comprising a coconut type oil interesterified with the triglycerides of fatty acids having 8, 10, 16 and 18 carbon atoms, the relative proportions of the acids in said interesterified oil being about 21% of capric and caprylic, about 61% of lauric and myristic, and about 18% of palmitic and stearic, the product having a setting point of about 23.6° C., a Wiley melting point of 88°–89° F. and a penetration at 70° F. of about 45.

7. A fat composition for incorporation in margarine comprising a coconut type oil interesterified with the triglycerides of fatty acids having 8, 10, 16 and 18 carbon atoms, the relative proportions of the acids in said interesterified oil being about 15% of capric and caprylic, about 47% of lauric and myristic, and about 38% of palmitic and stearic, the product having a setting point of about 22.5° C., a Wiley melting point of about 90° F., and a penetration at 70° F. of about 47.

8. A fat composition for incorporation in margarine comprising a coconut type oil interesterified with the triglycerides of fatty acids having 8, 10, 16 and 18 carbon atoms, the relative proportions of the acids in said interesterified oil being about 11% of capric and caprylic, about 26% of lauric and myristic, and about 59% of palmitic and stearic, the product having a setting point of about 23° C., a Wiley melting point of 92°–93° F., and a penetration at 70° F. of about 45.

9. A composition according to claim 1 to which from 1–15% of a triglyceride of an acid having at least 16 carbon atoms is physically added.

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