Abstract:

An edible spread formulation and method of production thereof, the formulation including: (a) at least 2% olive oil by weight; (b) at least one edible oil, in addition to the olive oil, the formulation containing a total of 12% to 78%, by weight, of the edible oil and the olive oil; and (c) 3% to 33%, by weight, of at least one flavoring solid, the flavoring solid selected from the group consisting of cocoa solids, carob powder, nut solids and nut paste, tahina mass, and coffee solids, the olive oil, the edible oil, and the at least one flavoring solid intimately mixed within the formulation, wherein a weight ratio of the at least one flavoring solid to the olive oil within the formulation is at least 0.2:1, and wherein the edible spread formulation is a solid at 25°C and atmospheric pressure.
Olive Oil Based Flavored Solid Food Products

CROSS-REFERENCE TO RELATED APPLICATIONS

This application draws priority from UK Patent Application No. GB1021653.9, filed December 21, 2010, which draws priority from IL Patent Application No. IL204718 filed March 25, 2010, which draws priority from UK Patent Application No. GB1003602.8, filed March 4, 2010, all of which are incorporated by reference for all purposes as if fully set forth herein.

FIELD AND BACKGROUND OF THE INVENTION

The present invention relates to flavored solid foods and food compositions, and, more particularly, to olive oil based flavored solid food compositions and formulations and methods of producing such compositions and formulations.

Flavored spreads, and chocolate and nut spreads in particular, have a plethora of performance criteria, in addition to the obvious—and somewhat subjective—criterion of taste. Additional organoleptic criteria include mouthfeel, aroma, and appearance.

Chocolate spreads, by way of example, need to be substantially free of stratification or phase separation whereby a light, liquid oil phase separates out of the bulk material. Other important physical and mechanical properties include smoothness, spreadability, melting profile, and hardening during storage ("post-hardening"). The melting profile may advantageously be adapted such that the spread does not melt or undergo a phase transition during product shipping, in which the temperature of non-refrigerated cargo may reach 30°C, 35°C, or even 40°C.

The components of the spread must be chemically compatible, and resist oxidation. Over the course of the normal shelf life (typically up to 1 year), the spread must also display resistance to microbes including various strains of bacteria and mold.

While solid fat content is used to promote product stability and shelf life, conventional solid fats such as partially-hydrogenated oils may contain large quantities of trans fatty acids, and may be considered disadvantageous from a health standpoint.

We believe there is a need for further improvements in olive oil based flavored solid food compositions and formulations, and the subject matter of the present disclosure and claims is aimed at fulfilling this need.
SUMMARY OF THE INVENTION

According to the teachings of the present invention there is provided an edible spread formulation including: (a) at least 2% olive oil by weight; (b) at least one edible oil, in addition to the olive oil, the formulation containing a total of 12% to 75%, by weight, of the edible oil and the olive oil; (c) 3% to 33%, by weight, of at least one flavoring solid, the flavoring solid selected from the group consisting of cocoa solids, carob powder, and nut solids or nut paste; and (d) at least one sweetener, the edible oil, the at least one flavoring solid, and the sweetener intimately mixed within the formulation, wherein a weight ratio of the at least one flavoring solid to the olive oil within the formulation is at least 0.4:1, and wherein the edible spread formulation is a solid at 25°C and atmospheric pressure.

According to another aspect of the present invention there is provided an edible spread formulation including: (a) at least 4% olive oil by weight; (b) at least one edible oil, in addition to the olive oil, the formulation containing a total of 12% to 75%, by weight, of the edible oil and the olive oil; (c) 3% to 33%, by weight, of at least one flavoring solid, the flavoring solid selected from the group consisting of cocoa solids, carob powder, and nut solids or nut paste; and (d) at least one sweetener, the edible oil, the at least one flavoring solid, and the sweetener intimately mixed within the formulation, wherein a weight ratio of the at least one flavoring solid to the olive oil within the formulation is at least 0.4:1, wherein the edible spread formulation is a solid at 25°C and atmospheric pressure, and wherein a yield stress of the spread formulation, at 25°C and atmospheric pressure, is at least 125 Pa.

According to another aspect of the present invention there is provided an edible spread formulation including: (a) at least 2% olive oil by weight; (b) at least one edible oil, in addition to the olive oil, the formulation containing a total of 12% to 78%, by weight, of the edible oil and the olive oil; and (c) 3% to 33%, by weight, of at least one flavoring solid, the flavoring solid selected from the group consisting of cocoa solids, carob powder, nut solids and nut paste, tahina mass, and coffee solids, the olive oil, the edible oil, and the at least one flavoring solid intimately mixed within the formulation, wherein a weight ratio of the at least one flavoring solid to the olive oil within the formulation is at least 0.2:1, at least 0.25:1, at least 0.3:1, at least 0.4:1, at least 0.6:1, at least 0.7:1, at least 0.8:1, or at least 0.9:1, and wherein the edible spread formulation is a solid at 25°C and atmospheric pressure.
According to further features in the described preferred embodiments, a weight content of the olive oil within the formulation is at least 2.5%, at least 3%, at least 4%, at least 6%, at least 8%, or at least 10%.

According to still further features in the described preferred embodiments, the formulation further includes a hardening agent.

According to still further features in the described preferred embodiments, the hardening agent includes, largely includes, or mainly includes at least one of a monoacylglycerol and a diacylglycerol.

According to still further features in the described preferred embodiments, the hardening agent predominantly includes, or consists essentially of, at least one of the monoacylglycerol and the diacylglycerol.

According to still further features in the described preferred embodiments, a yield stress of the spread formulation, at 25°C and atmospheric pressure, is at least 75 Pa, at least 100 Pa, at least 125 Pa, at least 150 Pa, at least 200 Pa, at least 250 Pa, at least 300 Pa, at least 350 Pa, at least 400 Pa, or at least 500 Pa.

According to still further features in the described preferred embodiments, the yield stress is less than 775 Pa, less than 700 Pa, less than 650 Pa, less than 600 Pa, or less than 575 Pa.

According to still further features in the described preferred embodiments, the at least one flavoring solid includes, largely includes, mainly includes, predominantly includes, or consists essentially of the cocoa solids.

According to still further features in the described preferred embodiments, the at least one flavoring solid includes, largely includes, mainly includes, predominantly includes, or consists essentially of the carob powder.

According to still further features in the described preferred embodiments, the at least one flavoring solid includes, largely includes, mainly includes, predominantly includes, or consists essentially of at least one of the nut solids or the nut paste.

According to still further features in the described preferred embodiments, a content of saturated fatty acids within the formulation is less than 15%, less than 13%, less than 11%, less than 10%, less than 9%, or less than 8%.

According to still further features in the described preferred embodiments, a content of trans fatty acids within the formulation is less than 0.25%, less than 0.2%, less than 0.15%, less than 0.10%, or less than 0.05%.
According to still further features in the described preferred embodiments, a ratio of monounsaturated fatty acids to saturated fatty acids within the formulation is at least 1.5:1, at least 1.6:1, at least 1.65:1, at least 1.7:1, at least 1.75:1, or at least 1.8:1.

According to still further features in the described preferred embodiments, a ratio of unsaturated fatty acids to saturated fatty acids within the formulation is at least 1.85:1, at least 2:1, at least 2.05:1, at least 2.1:1, at least 2.15:1, or at least 2.2:1.

According to still further features in the described preferred embodiments, a weight content of the olive oil within the formulation is at least 2.5%, at least 3%, at least 4%, at least 6%, at least 8%, at least 10%, at least 12%, at least 15%, at least 20%, at least 25%, or at least 30%.

According to still further features in the described preferred embodiments, a total weight content of the cocoa solids, the carob powder, the nut solids and the nut paste, the tahina mass, and the coffee solids, within the formulation, is at least 4%, at least 5%, at least 6%, at least 8%, at least 10%, at least 12%, at least 15%, at least 20%, at least 25%, at least 30%, or at least 35%.

According to still further features in the described preferred embodiments, a total weight content of the cocoa solids, the carob powder, the nut solids and the nut paste, the tahina mass, and the coffee solids within the formulation is at least 4%, at least 5%, at least 6%, at least 8%, or at least 10%, and less than 30%, less than 26%, less than 24%, less than 22%, less than 20%, or less than 18%.

According to still further features in the described preferred embodiments, a weight ratio of the cocoa solids to the olive oil is at least 0.3 to 1, at least 0.4 to 1, at least 0.45 to 1, at least 0.5 to 1, at least 0.7 to 1, at least 0.8 to 1, or at least 0.9 to 1.

According to still further features in the described preferred embodiments, the formulation contains, by weight, less than 7% water, less than 5% water, less than 2% water, or less than 1% water, or is substantially water-free.

According to still further features in the described preferred embodiments, the formulation contains, by weight, less than 5% dairy product, less than 4% dairy product, less than 2% dairy product, less than 1% dairy product, or less than 0.5% dairy product, or is substantially free of dairy product.

According to still further features in the described preferred embodiments, the at least one flavoring solid includes, largely includes, predominantly includes, or consists essentially of the tahina mass.
According to still further features in the described preferred embodiments, the at least one flavoring solid includes, largely includes, predominantly includes, or consists essentially of the coffee solids.

According to still further features in the described preferred embodiments, the formulation further includes at least one sweetener.

According to still further features in the described preferred embodiments, the sweetener includes at least one polyol ((2R,3R,4R,5S)-hexane-1,2,3,4,5,6-hexol).

According to still further features in the described preferred embodiments, the formulation contains, by weight, at least 2%, at least 4%, at least 6%, at least 8%, at least 10%, or at least 12% of the sweetener.

According to still further features in the described preferred embodiments, the sweetener includes, largely includes, predominantly includes, or consists essentially of at least one sugar.

According to still further features in the described preferred embodiments, a weight content of at least one of the monoacylglycerol and the diacylglycerol is at least 0.2%, at least 0.3%, at least 0.4%, or at least 0.5%.

According to still further features in the described preferred embodiments, a weight ratio of at least one of the monoacylglycerol and the diacylglycerol to the olive oil is at least 0.015, at least 0.025, at least 0.03, at least 0.04, or at least 0.05.

According to still further features in the described preferred embodiments, a content of at least one of the monoacylglycerol and the diacylglycerol is selected whereby the formulation consists of a solid phase at least within a range of 15°C to 27°C.

According to still further features in the described preferred embodiments, a content of at least one of the monoacylglycerol and the diacylglycerol is selected whereby the yield stress is at least 150 Pa, at least 200 Pa, at least 250 Pa, at least 275 Pa, at least 300 Pa, at least 350 Pa, at least 400 Pa, or at least 500 Pa.

According to still further features in the described preferred embodiments, a content of saturated fatty acids within the formulation is less than 12%, less than 11%, less than 10%, less than 9%, or less than 8%, and a content of trans fatty acids within the formulation is less than 0.25%, less than 0.2%, less than 0.15%, less than 0.10%, or less than 0.05%.

According to still further features in the described preferred embodiments, the
formulation contains, by weight, less than 5% water, less than 2% water, less than 1% water, or less than 0.5% water, or is substantially water-free.

According to still further features in the described preferred embodiments, the formulation contains, by weight, less than 5% dairy product, less than 4% dairy product, less than 2% dairy product, less than 1% dairy product, or less than 0.5% dairy product, or is substantially free of dairy product.

According to still further features in the described preferred embodiments, the formulation further includes an emulsifier.

According to still further features in the described preferred embodiments, a total weight content of the emulsifier and at least one of the monoacylglycerol and the diacylglycerol is at least 0.8%, at least 1%, at least 1.2%, or at least 1.4%.

According to still further features in the described preferred embodiments, a quantity of at least one of the edible oil and a hardening agent is selected whereby the formulation consists of a single solid phase at 30°C or 35°C.

According to still further features in the described preferred embodiments, a total cocoa butter content within the formulation, including a cocoa butter content within the cocoa solids, is less than 4%, less than 3%, less than 2%, or less than 1.5%.

According to still further features in the described preferred embodiments, the total weight content of the edible oil and the olive oil is below 70%, below 65%, below 60%, below 55%, or below 50%.

According to still further features in the described preferred embodiments, the total weight content of the edible oil and the olive oil is at least 15%, at least 18%, at least 20%, at least 25%, or at least 30%.

According to still further features in the described preferred embodiments, a weight ratio of the olive oil to the edible oil is at least 1 to 25, at least 1 to 20, at least 1 to 12, at least 1 to 10, at least 1 to 8, at least 1 to 5, at least 1 to 4, at least 1 to 3, at least 1 to 2, at least 2 to 3, or at least 1 to 1, at least 1.5 to 1, at least 2 to 1, at least 3 to 1, or at least 5 to 1.

According to still further features in the described preferred embodiments, the polyol includes maltitol.

According to still further features in the described preferred embodiments, the emulsifier includes lecithin.

According to still further features in the described preferred embodiments, the
olive oil, the edible oil, and the at least one flavoring solid are disposed in a substantially homogeneous manner within the formulation.

According to still further features in the described preferred embodiments, the formulation is substantially a phase stable solid food spread at 25°C.

According to still further features in the described preferred embodiments, the formulation is substantially a chemically stable solid food spread at 25°C.

According to still further features in the described preferred embodiments, the edible spread formulation is at least partially enveloped by an edible coating material.

According to still further features in the described preferred embodiments, the edible spread formulation is largely enveloped, substantially enveloped, or completely enveloped by an edible coating material.

According to still further features in the described preferred embodiments, the edible coating material includes, largely includes, predominantly includes, or consists essentially of a marzipan.

According to still further features in the described preferred embodiments, the edible coating material includes, largely includes, predominantly includes, or consists essentially of nuts.

According to still further features in the described preferred embodiments, the edible coating material includes, largely includes, predominantly includes, or consists essentially of chocolate.

According to still further features in the described preferred embodiments, the edible oil includes, largely includes, predominantly includes, or consists essentially of olive oil.

According to still further features in the described preferred embodiments, the olive oil content of the formulation is at most 22%, at most 20%, or at most 18%.

According to still further features in the described preferred embodiments, the formulation contains added nutritional fiber.

According to still further features in the described preferred embodiments, the formulation contains at least 2%, at least 4%, at least 6%, or at least 8% added nutritional fiber.

According to still further features in the described preferred embodiments, the formulation containing at least 2%, at least 4%, at least 6%, or at least 8% of at least one flour.
According to still further features in the described preferred embodiments, the total weight content of the nutritional fiber and a flour within the formulation is at least 2%, at least 4%, at least 6%, or at least 8%.

According to still further features in the described preferred embodiments, the total weight content of the nutritional fiber and the flour within the formulation is at least 2%, at least 4%, at least 6%, or at least 8%, and up to 24%, up to 22%, or up to 20%.

According to still further features in the described preferred embodiments, the hardening agent includes a fat powder.

According to still further features in the described preferred embodiments, the fat powder contains at least 90%, at least 95%, at least 98%, or at least 99% saturated fats.

According to still further features in the described preferred embodiments, the fat powder has a solid fat content of at least 90%, at least 95%, at least 96%, or at least 97%, at 20°C.

According to still further features in the described preferred embodiments, the fat powder has a solid fat content of at least 70%, at least 80%, at least 85%, or at least 90%, at 50°C.

According to still further features in the described preferred embodiments, the fat powder has a solid fat content of up to 20%, up to 10%, up to 5%, or up to 3%, at 60°C.

According to still further features in the described preferred embodiments, the formulation is free or substantially free of preservatives or artificial preservatives.

According to another aspect of the present invention there is provided a method of producing the edible spread formulation disclosed herein, the method including the steps of: (a) introducing, to a vessel, materials containing at least one edible oil, the olive oil, and the at least one flavoring solid; and (b) mixing contents of the vessel, whereby the olive oil, the edible oil, and the at least one flavoring solid, become intimately mixed within the formulation.

According to another aspect of the present invention there is provided a method of producing the edible spread formulation disclosed herein, the method including the steps of: (a) introducing, to a vessel, materials containing the olive oil, a hardening
agent, and the at least one flavoring solid; and (b) mixing contents of the vessel, whereby the olive oil, the hardening agent, and the at least one flavoring solid, become intimately mixed within the formulation.

According to still further features in the described preferred embodiments, the method further includes the step of enveloping or at least partially enveloping the spread formulation with an edible coating material.

According to still further features in the described preferred embodiments, the method further includes the step of cooling the spread formulation to, or below, room temperature.

According to still further features in the described preferred embodiments, the step of cooling the spread formulation is performed prior to the step of at least partially enveloping the spread formulation.

According to still further features in the described preferred embodiments, at least a portion of the olive oil is disposed in an olive oil base spread including the hardening agent.

According to still further features in the described preferred embodiments, the temperature of the contents of the vessel is maintained above a melting temperature of the olive oil base spread, whereby the spread transforms into a liquid.

According to still further features in the described preferred embodiments, the vessel includes, or consists of, a ball mill.

According to still further features in the described preferred embodiments, during the mixing, a temperature of the vessel contents is maintained below 85°C, below 70°C, below 60°C, or below 50°C.

According to still further features in the described preferred embodiments, the vessel is, or is part of, a chocolate refiner or conche.

According to another aspect of the present invention there is provided an edible spread formulation including: (a) at least 2% olive oil by weight; (b) at least one edible oil, in addition to the olive oil, the formulation containing a total of 12% to 78%, by weight, of the edible oil and the olive oil; and (c) 3% to 33%, by weight, of at least one flavoring solid, the olive oil, the edible oil, and the at least one flavoring solid intimately mixed within the formulation, wherein a weight ratio of the at least one flavoring solid to the olive oil within the formulation is at least 0.2:1, at least 0.25:1, at least 0.3:1, at least 0.4:1, at least 0.6:1, at least 0.7:1, at least 0.8:1, or at least 0.9:1, and
wherein the edible spread formulation is a solid at 25°C and atmospheric pressure.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The principles of the olive-oil based, flavored solid or solid spread formulations of the present invention, and methods for producing such formulations, may be better understood with reference to the drawings and the accompanying description.

Before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments or of being practiced or carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein is for the purpose of description and should not be regarded as limiting.

Throughout the disclosure, flavored spreads may, in exemplary fashion, be referred to as chocolate spread, without any implied loss of generality. One aspect of the present invention relates to olive oil based flavored spreads such as chocolate spreads. The use of olive oil has several significant drawbacks in producing a viable chocolate spread. Olive oil characteristically has a light phase that tends to remain liquid at room temperature. The introduction of olive oil to conventional chocolate spread compositions may severely compromise the homogeneity of such spreads. Moreover, olive oils have complex flavor profiles, which may overwhelm, rather than enhance, the otherwise sweet and rich taste of the chocolate spread.

The complex flavor profiles of olive oils may be strongly influenced by a plethora of factors, including the type of olive, maturity at harvesting, and the growing, harvesting, storing, and processing conditions. Nonetheless, olive oils may characteristically exhibit bitterness and pungency.

The distinctive organoleptic characteristics of olive oil may be attributed to over one hundred organic compounds, including various aliphatic and aromatic hydrocarbons, aliphatic and triterpenic alcohols, aldehydes, ketones, esters, furan and thiophene derivatives. Aglycons and tyrosol may be largely responsible for the bitterness and pungency of the olive oil, as well as alpha-tocopherol. Various phenols may contribute to the astringency. The major volatile species within the olive oil,
including hexanal, trans-2-hexenal, and 1-hexanol and 3-methylbutan-1-ol, may appreciably contribute to the strong taste and/or after-taste of the olive oil.

We have found that even relatively mild, light-flavored olive oil may deleteriously influence the taste and/or after-taste of chocolate spreads. Moreover, such mildness in the flavor of the olive oil may be substantially independent of the physical properties of the oil, such that the spread is much more prone to phase separation.

However, we have found that by maintaining a particular, minimum weight ratio of flavorant — a chocolate flavorant such as cocoa powder, a carob flavorant such as carob powder, a nut flavorant such as nut solids or nut paste, and/or a tahina flavorant such as tahina mass — to olive oil, both the disharmonious flavor and smell of the olive oil may be substantially masked, or possibly modified into an acceptable or desirable flavor.

The introduction of additional flavorant such as cocoa powder may, however, deleteriously affect the mouthfeel of the spread. The spread may be grainy or chalky, which may also negatively impact spreadability. Moreover, we have found that the additional cocoa butter contributed by the cocoa powder may produce granular material that may detract from the smoothness and the spreadability of the spread.

According to one aspect of the present invention there is provided a flavored, edible spread formulation including: (a) olive oil; (b) at least one edible oil, in addition to the olive oil, the formulation containing a total of about 12% to about 78% (and more typically, up to 75%) of the edible oil and the olive oil; and (c) at least one flavoring solid, typically at least 3%, by weight, the flavoring solid selected from the group consisting of cocoa solids, carob powder, nut solids or nut paste, tahina mass, and coffee, the components being well distributed within the formulation. The weight ratio of the at least one flavoring solid to the olive oil within the formulation is preferably at least 0.2:1, at least 0.25:1, at least 0.3:1, at least 0.4:1, at least 0.6:1, at least 0.7:1, at least 0.8:1, or at least 0.9:1. The edible spread formulation may advantageously be a solid at 25°C and atmospheric pressure, and typically maintains its phase stability for the entire shelf life of the product (up to two years or more).

The formulation may advantageously include at least one hardening agent. Preferably, the hardening agent includes, largely includes, predominantly includes, or consists essentially of at least one of a monoacylglycerol and a diacylglycerol. The use of acylglycerols may obviate the need for hydrogenated or partially hydrogenated fats,
materials that may be particularly disadvantageous from various health standpoints.

Partially hydrogenated fats may be rich in the trans formation of fats, a formation that may rarely be found in nature. Prior to the hydrogenation process, pairs of hydrogen atoms occur together on the chain of the fatty acid, in the cis formation. During hydrogenation, however, one hydrogen atom is moved to the other side of the chain, producing the trans formation. Trans fats may be incorporated into cell membranes as if they were cis fats, and may deleteriously impact the metabolism of the cell.

Thus, the flavored solid or solid spread of the present invention may preferably be free or substantially free of hydrogenated or partially hydrogenated fats and oils, and free or substantially free of trans fatty acids.

In various embodiments, the inventive solid or solid spread may be free or substantially free of dairy products.

In various embodiments, the inventive spread may be free or substantially free of an aqueous phase. The presence of such an aqueous phase may deleteriously affect the stability of the spread, whereby the nutritional value and product shelf-life may be compromised. The inventive spread may thus be free or substantially free of preservatives or artificial preservatives.

In terms of phase stability, the flavored spreads of the present invention may exhibit phase stability over a shelf life of six months, one year, or two years or more.

The flavored solid or solid spreads of the present invention may be rich in various nutritional components. For example, the olive oil within the inventive formulation may be rich in oleic acid, a monounsaturated fat, and in various antioxidants such as vitamin E, various carotenoids, and oleuropein, which may inhibit the oxidation of low-density lipoprotein (LDL) particles. Many olive oils of widely varying taste characteristics have been found to be suitable for use in conjunction with the present invention. Presently preferred olive oils may include picual, leccino, and nabali olive oils, as well as various oils produced from olives grown under conditions of relatively high salinity. The use of extra virgin olive oil of the various olive species may also provide the spreads of the present invention with the highest concentrations of nutrients and other substances that are advantageous from a health standpoint.

In order to substantially mask or advantageously modify the taste of the olive oil, the weight ratio of the flavoring solid or solids to the olive oil may be at least 0.2:1,
at least 0.25:1, at least 0.3:1, at least 0.4:1, at least 0.6:1, at least 0.7:1, at least 0.8:1, or at least 0.9:1. Below a ratio of 0.2:1, the taste of the olive oil may disadvantageously affect the taste of the flavored spread. This may be particularly true for sweet flavored spreads such as chocolate spread, nut spreads, carob spread, halva spread, and coffee spread. In the case of olive oils exhibiting appreciable bitterness and/or pungency, the weight ratio of the sweet flavoring solid or solids to the olive oil may be at least 0.25:1, at least 0.3:1, or even at least 0.4:1. Below these ratios, such spreads may not have the sweet spread tastes that are familiar and desirable to many consumers.

The use of coffee solids may be rather similar to that of carob. Both solids are characterized by a distinctive taste and an extremely low fat concentration. As is evident from the description and in particular, from the Examples provided hereinbelow, the use of carob solids may be rather similar to that of cocoa solids.

Unlike carob, however, cocoa solids may contain cocoa butter. To obtain an acceptably smooth texture, the total cocoa butter content within the spread formulation may be restricted to at most 4%, at most 3%, at most 2%, at most 1.5%, or at most 1.25%.

The tahina used in the inventive spreads may be made from shelled sesame seeds, unshelled sesame seeds, or a combination thereof. Within the tahina, approximately 55-60% may be sesame oil. The remainder of the tahina, termed "tahina mass", provides the major contribution to the flavor of the tahina or halva spread. We have found that the flavor of the tahina mass is potent, and successfully masks or modifies the taste of the olive oil, even at relatively low ratios of tahina mass to olive oil. Typically the ratio of tahina mass to olive oil is at least 0.20:1, at least 0.25:1, at least 0.3:1, at least 0.4:1, or at least 0.6:1.

The inventive spreads may exhibit specific rheological behavior, as manifested in yield stress testing, and in shear rate sweep testing. In yield stress testing, the applied stress in the rheometer is typically ramped up until motion is detected. The stress is then ramped down until motion stops. There is usually hysteresis in this process, as structure takes time to build up.

In the spreads of the present invention, the yield stress of the spread, at room temperature (25°C) and pressure, is typically at least 75 Pa, at least 100 Pa, at least 125 Pa, at least 150 Pa, at least 200 Pa, or at least 250 Pa or more. The yield stress under these conditions may typically be less than 775 Pa, less than 700 Pa, less than 650 Pa,
less than 600 Pa, or less than 575 Pa.

A quantity of the edible oil and/or the hardening agent may be increased whereby the formulation consists of a single solid phase, even at elevated temperatures of 30°C or 35°C.

Moreover, the inventive spreads may exhibit shear-thinning properties, with the viscosity decreasing as a function of shear rate. This property may enable production of a spread that is advantageously stiff within the container, but advantageously softens during the spreading on bread or the like.

Higher solidity and higher yield stresses may be attained in different ways, inter alia, by reducing the olive oil content (or other edible oil content), increasing the content of cocoa solids and/or cocoa butter, and/or by increasing the content of the hardening agent.

The textural properties of the inventive spread formulations may be improved by the addition of soy flour, pea flour, wheat flour, rice flour, or other vegetable, legume, or grain-based flours. The textural properties of the inventive spread formulations may be improved by the addition of fiber such as nutritional fiber. The presence of the flour and/or fiber may appreciably reduce the oiliness of the spread formulation.

Preferably, the total content of the flour and the fiber is at least 2% or at least 3% of the spread formulation, by weight. More typically, the total content of the flour and the fiber is at least 4%, at least 6%, at least 8%, or at least 10% of the spread formulation, by weight. Above a total flour and fiber weight content of 30%, the spread formulation may be excessively grainy or powdery. Preferably, the total weight content of the flour and the fiber within the formulation is up to 28%, up to 25%, up to 22%, or up to 20%.

While in practice, the above figures contemplate either a flour content of 0% or a fiber content of 0%, it may be particularly advantageous for a particular spread formulation to include both fiber and at least one such flour.

The spread may be processed (e.g., ground or blended) to achieve a fine grain size, whereby the mouthfeel of the spread is advantageously smooth. If desired, nut solids may be added towards the end of the processing, to avoid comminution thereof.

In a preferred embodiment of the present invention, a flavored spread of the present invention is at least partially enveloped, largely enveloped, mainly enveloped,
substantially enveloped, or completely enveloped by an edible solid coating, such as a chocolate coating or a marzipan coating. Typically, the hardness of this outer coating exceeds the hardness of the flavored spread. Preferably, the exterior of the coating is formulated to enable the individual to hold the coated product, while eating, without the product melting in the hand or otherwise leaving sticky remnants thereon. The coating typically has a thickness of at least 1mm, and more typically, a thickness of at least 2mm.

EXAMPLES

Reference is now made to the following examples, which together with the above description, illustrate the invention in a non-limiting fashion.

EXAMPLE 1

Olive oil based flavored spreads of the present invention may be produced according to the following exemplary procedure:

Raw materials may be introduced into a processing machine, typically according to the following sequence:

A. vegetable fat and/or oil, such as a palm oil (optional);
B. an olive oil or an olive oil base spread including olive oil and a hardening agent such as at least one monoacylglycerol and/or diacylglycerol;
C. sugar and/or at least one reduced calorie bulk sweetener (optional); and
D. at least one flavoring solid, such as cocoa solids, carob powder, nut solids or nut paste, tahina mass, and coffee.

The materials may be heated and agitated in the processing machine to produce a viscous, largely homogeneous spread. The residence time may be highly dependent on the type of processing machine or mixing equipment used.

When using an olive oil base solid, the temperature of the mixture may be maintained below a temperature at which the olive oil base solid transforms into a liquid. This temperature may depend, inter alia, on the composition of the olive oil base spread, interactions with other ingredients in the mixture, the rheological properties of the mixture, and the mixing regime within the vessel. Typically, however, this temperature exceeds 30°C, but may be less than 85°C, less than 70°C, less than
60°C, or less than 50°C.

In a processing machine (typically a heated chocolate refiner or conche, such as those produced by MacIntyre Chocolate Systems, Arbroath, Scotland), the solid particles in at least one of the various flavoring solids may be refined by grinding bars that scrape along the serrated inner wall of the vessel. During the process, the pressure exerted on the grinding bars may be gradually increased to produce particles of increasing fineness. The cocoa butter (or other flavoring solids) may become better distributed within the mixture, and rounding of the particles may also be achieved. The processing may typically be effected for up to 12 hours.

By the end of the processing, the temperature of the flavored spread may be reduced to about room temperature.

**EXAMPLE IB**

In some formulations, particularly those containing appreciable amounts of solid particulate matter such as nutritional fiber and/or vegetable solids such as vegetable protein solids or vegetable flour (e.g., soy flour, pea flour, potato flour), it may be highly advantageous, or perhaps even necessary, to process the mixture in a ball mill, to obtain the requisite homogeneity and smoothness.

The main ingredients may be introduced into the ball mill, according to the following sequence:

a. olive oil base spread (described in further detail in Example 3);

b. fat powder, fat, and/or oil;

c. other main ingredients (at least one flavoring solid, bulk sweetener, nutritional fiber, etc.).

The olive oil base spread may be heated to form a viscous liquid phase. During operation of the mill, an additional fat component may be added to the vessel, typically as liquid phase or a heated liquid phase. The other main ingredients, typically solids such as flavoring solids or paste, and optionally including at least one of a bulk sweetener, nutritional fiber, and flour, may be introduced subsequently. The total residence time may typically be within a range of 20 to 120 minutes.
**EXAMPLE 2**

Various optional ingredients may be introduced to the refiner/conche, ball mill, etc., including a sweetener such as Acesulfame K (Acesulfame Potassium), vanillin, and an emulsifier such as lecithin. These ingredients may typically be introduced after the ingredients provided in Example 1 or Example IB, typically, after the bulk of the agitation has been effected.

**EXAMPLE 3**

A base spread including olive oil was produced according to the following exemplary procedure:

(a) providing an olive oil, at least one edible hardening agent such as monoacylglycerol and/or diacylglycerol, and optionally, at least one additional edible oil;

(b) mixing the olive oil and optionally, the at least one additional edible oil;

(c) introducing at least one edible hardening agent and mixing, under moderate heating, as necessary, to produce a viscous liquid mixture, typically at a temperature between 40°C and about 90°C; and

(d) cooling the mixture, typically to about room temperature, to form a base spread for use as a raw material for the flavored spreads of the present invention.

**EXAMPLE 4**

An olive oil based chocolate flavored spread was produced according to the exemplary procedures provided in Examples 1, 2 and 3. The inventive spread included the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olive oil</td>
<td>14%</td>
</tr>
<tr>
<td>Monoacylglycerol</td>
<td>1%</td>
</tr>
<tr>
<td>Olive oil base spread</td>
<td>15% (total)</td>
</tr>
<tr>
<td>Lecithin</td>
<td>0.5%</td>
</tr>
<tr>
<td>Sugar</td>
<td>34%</td>
</tr>
<tr>
<td>Maltitol</td>
<td>20%</td>
</tr>
<tr>
<td>Cocoa powder</td>
<td>16%</td>
</tr>
<tr>
<td>Palm oil</td>
<td>8%</td>
</tr>
<tr>
<td>Nut paste (Spreadix #10459)</td>
<td>6%</td>
</tr>
</tbody>
</table>
The cocoa powder used contained about 10% cocoa butter. The palm oil product (such as Spreadix #10459, Basic, Indonesia) is typically fully refined, bleached and deodorized. The specification of the palm oil product was as follows:

<table>
<thead>
<tr>
<th>Solid Fat Content (weight-%)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>at 10°C;</td>
<td>20-26</td>
</tr>
<tr>
<td>at 20°C;</td>
<td>6-10</td>
</tr>
<tr>
<td>at 25°C;</td>
<td>7 (max)</td>
</tr>
<tr>
<td>at 30°C;</td>
<td>5 (max)</td>
</tr>
<tr>
<td>at 35°C;</td>
<td>3 (max)</td>
</tr>
<tr>
<td>at 40°C;</td>
<td>1 (max)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fatty Acid Content (weight-%)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C:12</td>
<td>0.4 (max)</td>
</tr>
<tr>
<td>C:14</td>
<td>1.5 (max)</td>
</tr>
<tr>
<td>C:16</td>
<td>32-38</td>
</tr>
<tr>
<td>C:18-1</td>
<td>3-6</td>
</tr>
<tr>
<td>C:18-2</td>
<td>40-46</td>
</tr>
<tr>
<td>C:20</td>
<td>12-14</td>
</tr>
<tr>
<td>Other</td>
<td>1 (max)</td>
</tr>
<tr>
<td>Trans Fatty Acids</td>
<td>1 (max), typical 0.25 (max)</td>
</tr>
</tbody>
</table>

**EXAMPLE 5**

An olive oil based chocolate flavored spread was produced according to the exemplary procedures provided in Examples 1, 2 and 3. The inventive spread included the following components:

- olive oil: 10%
- mono and diacylglycerols: 0.5%
- olive oil base spread: 10.5% (total)
- lecithin: 0.5%
- sugar: 48%
cocoa powder: 12%
palm oil: 20%
(Spreadix #10459)
soy flour: 9%

EXAMPLE 6
An olive oil based chocolate flavored spread was produced according to the exemplary procedures provided in Examples 1, 2 and 3. The inventive spread included the following components:

- olive oil: 12%
- diacylglycerol: 0.5%
- olive oil base spread: 12.5% (total)
- lecithin: 0.5%
- sugar: 32%
- maltitol: 25%
- cocoa powder: 12%
- palm oil: 18%
  (Spreadix #10459)
- Acesulfame K: 0.04%

EXAMPLE 7
An olive oil based carob flavored spread was produced according to the exemplary procedures provided in Examples 1, 2 and 3. The inventive spread included the following:

- olive oil: 12%
- monoacylglycerol: 0.6%
- olive oil base spread: 12.6% (total)
- lecithin: 0.5%
- sugar: 32%
- maltitol: 25%
- carob powder: 10%
  (G.A. Torres, Spain)
- palm oil: 18%
  (Spreadix #10459)
- soy flour: 2%
Acesulfame K: 0.04%

**EXAMPLE 8**

An olive oil based nut flavored spread was produced according to the exemplary procedures provided in Examples 1, 2 and 3. The inventive spread included the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>olive oil</td>
<td>10%</td>
</tr>
<tr>
<td>mono and diacylglycerols</td>
<td>0.4%</td>
</tr>
<tr>
<td>olive oil base spread</td>
<td>0.4%</td>
</tr>
<tr>
<td>lecithin</td>
<td>0.5%</td>
</tr>
<tr>
<td>sugar</td>
<td>36%</td>
</tr>
<tr>
<td>maltitol</td>
<td>27.1%</td>
</tr>
<tr>
<td>palm oil</td>
<td>13%</td>
</tr>
<tr>
<td>(Spreadix #10459)</td>
<td></td>
</tr>
<tr>
<td>nut paste</td>
<td>13%</td>
</tr>
<tr>
<td>(hazelnut paste, Gursoy, Turkey)</td>
<td></td>
</tr>
<tr>
<td>vanillin</td>
<td>0.04%</td>
</tr>
<tr>
<td>salt</td>
<td>0.03%</td>
</tr>
<tr>
<td>Acesulfame K</td>
<td>0.04%</td>
</tr>
</tbody>
</table>

**EXAMPLE 9**

An olive oil based halva spread or sweetened tahina spread was produced according to the exemplary procedures provided in Examples IB, 2 and 3. The inventive spread included the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>olive oil</td>
<td>27%</td>
</tr>
<tr>
<td>mono and diacylglycerols</td>
<td>2%</td>
</tr>
<tr>
<td>olive oil base spread</td>
<td>29% (total)</td>
</tr>
<tr>
<td>lecithin</td>
<td>0.5%</td>
</tr>
<tr>
<td>sugar</td>
<td>34%</td>
</tr>
<tr>
<td>tahina</td>
<td>18%</td>
</tr>
<tr>
<td>fat powder (CESSA Powder 60®)</td>
<td>1%</td>
</tr>
<tr>
<td>soy flour</td>
<td>8%</td>
</tr>
<tr>
<td>vanillin</td>
<td>0.04%</td>
</tr>
<tr>
<td>salt</td>
<td>0.03%</td>
</tr>
<tr>
<td>nutritional fiber</td>
<td>9%</td>
</tr>
</tbody>
</table>
The fat powder is typically a spray chilled powder (such as CESSA Powder 60® of AarhusKarshamn, Sweden). The specification of CESSA Powder 60® includes the following typical values:

**Solid Fat Content (weight-%)**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°C</td>
<td>97</td>
</tr>
<tr>
<td>30°C</td>
<td>97</td>
</tr>
<tr>
<td>40°C</td>
<td>96</td>
</tr>
<tr>
<td>50°C</td>
<td>93</td>
</tr>
<tr>
<td>60°C</td>
<td>1</td>
</tr>
</tbody>
</table>

**Fatty Acid Content (weight-%)**

- saturated fatty acids: 99%
- monounsaturated fatty acids: 1%
- polyunsaturated fatty acids: 0%
- trans fatty acids: 1% (max)

**EXAMPLE 10**

An olive oil based tahina spread was produced according to the exemplary procedures provided in Examples 1B and 3. The inventive spread included the following components:

- olive oil: 44.2%
- mono and diacylglycerols: 3.3%
- olive oil base spread: -47.5% (total)
- tahina: -40%
- CESSA Powder 60®: 3%
- soy flour: 9%
- salt: 0.06%
EXAMPLE 11
An olive oil based coffee flavored spread was produced according to the exemplary procedures provided in Examples IB, 2 and 3. The inventive spread included the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>olive oil</td>
<td>43.16%</td>
</tr>
<tr>
<td>monoacylglycerol</td>
<td>3.75%</td>
</tr>
<tr>
<td>olive oil base spread</td>
<td>46.91% (total)</td>
</tr>
<tr>
<td>lecithin</td>
<td>0.5%</td>
</tr>
<tr>
<td>maltitol</td>
<td>35%</td>
</tr>
<tr>
<td>pea flour or powder</td>
<td>9%</td>
</tr>
<tr>
<td>coffee powder</td>
<td>5%</td>
</tr>
<tr>
<td>CESSA Powder 60®</td>
<td>0.5%</td>
</tr>
<tr>
<td>nutritional fiber</td>
<td>3%</td>
</tr>
<tr>
<td>vanillin</td>
<td>0.03%</td>
</tr>
<tr>
<td>salt</td>
<td>0.06%</td>
</tr>
</tbody>
</table>

EXAMPLE 12
An olive oil based almond (nut) flavored spread was produced according to the exemplary procedures provided in Examples IB, 2 and 3. The inventive spread included the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>olive oil</td>
<td>34.04%</td>
</tr>
<tr>
<td>monoacylglycerol</td>
<td>2.96%</td>
</tr>
<tr>
<td>olive oil base spread</td>
<td>37.0% (total)</td>
</tr>
<tr>
<td>lecithin</td>
<td>0.5%</td>
</tr>
<tr>
<td>maltitol</td>
<td>36%</td>
</tr>
<tr>
<td>CESSA Powder 60®</td>
<td>1%</td>
</tr>
<tr>
<td>almonds (roasted, ground)</td>
<td>21.39%</td>
</tr>
<tr>
<td>nutritional fiber</td>
<td>9%</td>
</tr>
<tr>
<td>vanillin</td>
<td>0.04%</td>
</tr>
<tr>
<td>nutritional fiber</td>
<td>4%</td>
</tr>
<tr>
<td>almond extract</td>
<td>0.01%</td>
</tr>
</tbody>
</table>
EXAMPLE 13

The composition of Example 8 was prepared according to the procedure of Example 1, but according to the following sequence:

The main ingredients were introduced into the conche, according to the following sequence:
   a. palm oil
   b. olive oil
   c. monoacylglycerol
   d. nut paste
   e. maltitol
   f. sugar

With the introduction of the olive oil, the batch contained a liquid phase. After introducing the monoacylglycerol and mixing the liquid phase remained. Even after introducing the nut paste, maltitol, and sugar, with concurrent and subsequent agitation, there remained a liquid phase in addition to the solid phase.

At the end of the processing, the temperature of the formulation was reduced to about room temperature. However, the formulation continued to have substantially distinct liquid and solid phases.

EXAMPLE 14

A coated spread product was produced according to the following exemplary procedure:
   (a) producing or providing an olive oil based flavored spread of the present invention according to the description hereinabove, including Examples 1-7;
   (b) preferably cooling the spread below room temperature;
   (c) at least partially enveloping the spread with an edible coating material.

In the case of a chocolate coating, the chocolate may be heated above room temperature, typically to between about 30°C and about 40°C, to produce a liquefied chocolate. The spread may then be contacted with the liquefied chocolate (e.g., by pouring, painting, immersion, etc.) to form a coated spread. After cooling, the coating on the coated spread may fully solidify, and the product may then be packaged.

Other methods of coating the spread will be apparent to those skilled in the art.
As used herein in the specification and in the claims section that follows, the term "sweetener" is specifically meant to include sugars, such as sucrose and fructose, as well as to reduced calorie bulk sweeteners, sugar alcohols including maltitol, sorbitol, isomalt, and xylitol, and natural sweeteners. The term "sweetener" is further specifically meant to include sugar substitutes or artificial sweeteners such as aspartame, saccharin or sucralose.

As used herein in the specification and in the claims section that follows, the term "largely includes", with respect to a component within a formulation, refers to a weight content of at least 30%.

As used herein in the specification and in the claims section that follows, the term "mainly includes", with respect to a component within a formulation, refers to a weight content of at least 50%.

As used herein in the specification and in the claims section that follows, the term "predominantly includes", with respect to a component within a formulation, refers to a weight content of at least 70%.

As used herein in the specification and in the claims section that follows, the term "fat" and the term "oil" are used interchangeably to refer collectively to fats and oils.

As used herein in the specification and in the claims section that follows, the term "tahina mass" refers to the composition of tahina, excluding the saturated, mono-unsaturated, and poly-unsaturated oil components. Typically, 100 grams of tahina (ground sesame seeds) contain about 55-60% oil components, and about 40-45% non-oil components, which are characterized as "flavoring solids" in the specification and in the claims section that follows.

As used herein in the specification and in the claims section that follows, the term "coffee solids" refers to various solid derivatives of coffee beans, and typically refers to ground roasted coffee beans.

As used herein in the specification and in the claims section that follows, the term "edible oil" is meant to exclude oils and fats disposed in any of the flavoring solids.

As used herein in the specification and in the claims section that follows, the term "phase-stable solid", with respect to a spread of the present invention, refers to a spread exhibiting phase stability at room temperature (25°C) for at least 6 months.
As used herein in the specification and in the claims section that follows, the term "chemically-stable solid", with respect to a spread of the present invention, refers to a spread whose components are substantially chemically inert with respect to each other, at room temperature (25°C), for at least 6 months.

As used herein in the specification and in the claims section that follows, the term "substantially homogeneous", with respect to a spread or solid food formulation, is meant to be used according to its meaning in the art of chocolate spread manufacturing.

As used herein in the specification and in the claims section that follows, the term "added nutritional fiber" refers to the nutritional fiber within the spread formulation, exclusive of natural nutritional fiber within the flavoring solids.

As used herein in the specification and in the claims section that follows, the term "flour", and the like, taken alone, is meant to include at least one grain, vegetable, or legume-based powder such as soy flour, pea flour, wheat flour, and rice flour. The term is further meant to include at least one grain, vegetable, or legume-based protein solids and at least one grain, vegetable, or legume-based meal or starch.

Whenever a numerical range is indicated herein, the range is meant to include the boundary values thereof.

As used herein in the specification and in the claims section that follows, ratios of components in the formulation are weight ratios.

It will be appreciated that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention, which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable sub-combination.

Although the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications and variations that fall within the spirit and broad scope of the appended claims.
WHAT IS CLAIMED IS

1. An edible spread formulation comprising:
   (a) at least 2% olive oil by weight;
   (b) at least one edible oil, in addition to said olive oil,
      the formulation containing a total of 12% to 78%, by weight, of said edible oil and
      said olive oil; and
   (c) 3% to 33%, by weight, of at least one flavoring solid, said flavoring solid
      selected from the group consisting of cocoa solids, carob powder, nut solids
      and nut paste, tahina mass, and coffee solids,
      said olive oil, said edible oil, and said at least one flavoring solid intimately mixed
      within the formulation,
      wherein a weight ratio of said at least one flavoring solid to said olive oil within the
      formulation is at least 0.2:1, at least 0.25:1, at least 0.3:1, at least 0.4:1, at least 0.6:1,
      at least 0.7:1, at least 0.8:1, or at least 0.9:1,
      and wherein the edible spread formulation is a solid at 25°C and atmospheric pressure.

2. The formulation of claim 1, wherein a weight content of said olive oil within
   the formulation is at least 2.5%, at least 3%, at least 4%, at least 6%, at least 8%, or at
   least 10%.

3. The formulation of claim 1 or claim 2, further comprising a hardening agent.

4. The formulation of claim 3, wherein said hardening agent includes, largely
   includes, or mainly includes at least one of a monoacylglycerol and a diacylglycerol.

5. The formulation of claim 4 wherein said hardening agent predominantly
   includes, or consists essentially of, said at least one of said monoacylglycerol and said
   diacylglycerol.

6. The formulation of any one of claims 1 to 5, wherein a yield stress of the
   spread formulation, at 25°C and atmospheric pressure, is at least 75 Pa, at least 100
   Pa, at least 125 Pa, at least 150 Pa, at least 200 Pa, at least 250 Pa, at least 300 Pa, at
   least 350 Pa, at least 400 Pa, or at least 500 Pa.
7. The formulation of claim 6, wherein said yield stress is less than 775 Pa, less than 700 Pa, less than 650 Pa, less than 600 Pa, or less than 575 Pa.

8. The formulation of any one of claims 1 to 7, wherein said at least one flavoring solid includes, largely includes, mainly includes, predominantly includes, or consists essentially of said cocoa solids.

9. The formulation of any one of claims 1 to 7, wherein said at least one flavoring solid includes, largely includes, mainly includes, predominantly includes, or consists essentially of said carob powder.

10. The formulation of any one of claims 1 to 7, wherein said at least one flavoring solid includes, largely includes, mainly includes, predominantly includes, or consists essentially of at least one of said nut solids or said nut paste.

11. The formulation of any one of claims 1 to 10, wherein a content of saturated fatty acids within the formulation is less than 15%, less than 13%, less than 11%, less than 10%, less than 9%, or less than 8%.

12. The formulation of any one of claims 1 to 11, wherein a content of trans fatty acids within the formulation is less than 0.25%, less than 0.2%, less than 0.15%, less than 0.10%, or less than 0.05%.

13. The formulation of any one of claims 1 to 12, wherein a ratio of monounsaturated fatty acids to saturated fatty acids within the formulation is at least 1.5:1, at least 1.6:1, at least 1.65:1, at least 1.7:1, at least 1.75:1, or at least 1.8:1.

14. The formulation of any one of claims 1 to 13, wherein a ratio of unsaturated fatty acids to saturated fatty acids within the formulation is at least 1.85:1, at least 2:1, at least 2.05:1, at least 2.1:1, at least 2.15:1, or at least 2.2:1.

15. The formulation of any one of claims 1 to 14, wherein a weight content of said olive oil within the formulation is at least 2.5%, at least 3%, at least 4%, at least 6%, at least 8%, at least 10%, at least 12%, at least 15%, at least 20%, at least 25%, or at least 30%.
16. The formulation of any one of claims 1 to 15, wherein a total weight content of said cocoa solids, said carob powder, said nut solids and said nut paste, said tahina mass, and said coffee solids, within the formulation, is at least 4%, at least 5%, at least 6%, at least 8%, at least 10%, at least 12%, at least 15%, at least 20%, at least 25%, at least 30%, or at least 35%.

17. The formulation of any one of claims 1 to 15, wherein a total weight content of said cocoa solids, said carob powder, said nut solids and said nut paste, said tahina mass, and said coffee solids within the formulation is at least 4%, at least 5%, at least 6%, at least 8%, or at least 10%, and less than 30%, less than 26%, less than 24%, less than 22%, less than 20%, or less than 18%.

18. The formulation of any one of claims 1 to 17, wherein a weight ratio of said cocoa solids to said olive oil is at least 0.3 to 1, at least 0.4 to 1, at least 0.45 to 1, at least 0.5 to 1, at least 0.7 to 1, at least 0.8 to 1, or at least 0.9 to 1.

19. The formulation of any one of claims 1 to 18, wherein the formulation contains, by weight, less than 7% water, less than 5% water, less than 2% water, or less than 1% water, or is substantially water-free.

20. The formulation of any one of claims 1 to 19, wherein the formulation contains, by weight, less than 5% dairy product, less than 4% dairy product, less than 2% dairy product, less than 1% dairy product, or less than 0.5% dairy product, or is substantially free of dairy product.

21. The formulation of any one of claims 1 to 20, wherein said at least one flavoring solid includes, largely includes, predominantly includes, or consists essentially of said tahina mass.

22. The formulation of any one of claims 1 to 20, wherein said at least one flavoring solid includes, largely includes, predominantly includes, or consists essentially of said coffee solids.

23. The formulation of any one of claims 1 to 22, further comprising at least one sweetener.
24. The formulation of claim 23, wherein said sweetener includes at least one polyol ((2R,3R,4R,5S)-hexane-1,2,3,4,5,6-hexol).

25. The formulation of claim 23 to 24, wherein the formulation contains, by weight, at least 2%, at least 4%, at least 6%, at least 8%, at least 10%, or at least 12% of said sweetener.

26. The formulation of any one of claims 23 to 25, wherein said sweetener includes, largely includes, predominantly includes, or consists essentially of at least one sugar.

27. The formulation of claim 4 or claim 5, wherein a weight content of said at least one of said monoacylglycerol and said diacylglycerol is at least 0.2%, at least 0.3%, at least 0.4%, or at least 0.5%.

28. The formulation of any one of claims 4, 5 or 27, wherein a weight ratio of said at least one of said monoacylglycerol and said diacylglycerol to said olive oil is at least 0.015, at least 0.025, at least 0.03, at least 0.04, or at least 0.05.

29. The formulation of any one of claims 4, 5, 27, or 28, wherein a content of said at least one of said monoacylglycerol and said diacylglycerol is selected whereby the formulation consists of a solid phase at least within a range of 15°C to 27°C.

30. The formulation of any one of claims 4, 5, 27-29, wherein a content of said at least one of said monoacylglycerol and said diacylglycerol is selected whereby said yield stress is at least 150 Pa, at least 200 Pa, at least 250 Pa, at least 275 Pa, at least 300 Pa, at least 350 Pa, at least 400 Pa, or at least 500 Pa.

31. The formulation of claim 30, wherein a content of saturated fatty acids within the formulation is less than 12%, less than 11%, less than 10%, less than 9%, or less than 8%, and a content of trans fatty acids within the formulation is less than 0.25%, less than 0.2%, less than 0.15%, less than 0.10%, or less than 0.05%.

32. The formulation of claim 31, wherein the formulation contains, by weight, less than 5% water, less than 2% water, less than 1% water, or less than 0.5% water, or is.
substantially water-free.

33. The formulation of claim 31 or 32, wherein the formulation contains, by weight, less than 5% dairy product, less than 4% dairy product, less than 2% dairy product, less than 1% dairy product, or less than 0.5% dairy product, or is substantially free of dairy product.

34. The formulation of any one of claims 1 to 33, further comprising an emulsifier.

35. The formulation of claim 34, wherein a total weight content of said emulsifier and said at least one of said monoacylglycerol and said diacylglycerol is at least 0.8%, at least 1%, at least 1.2%, or at least 1.4%.

36. The formulation of any one of claims 1 to 35, wherein a quantity of at least one of said edible oil and a hardening agent is selected whereby the formulation consists of a single solid phase at 30°C or 35°C.

37. The formulation of any one of claims 1 to 36, wherein a total cocoa butter content within the formulation, including a cocoa butter content within said cocoa solids, is less than 4%, less than 3%, less than 2%, or less than 1.5%.

38. The formulation of any one of claims 1 to 37, wherein said total weight content of said edible oil and said olive oil is below 70%, below 65%, below 60%, below 55%, or below 50%.

39. The formulation of any one of claims 1 to 38, wherein said total weight content of said edible oil and said olive oil is at least 15%, at least 18%, at least 20%, at least 25%, or at least 30%.

40. The formulation of any one of claims 1 to 39, wherein a weight ratio of said olive oil to said edible oil is at least 1 to 25, at least 1 to 20, at least 1 to 12, at least 1 to 10, at least 1 to 8, at least 1 to 5, at least 1 to 4, at least 1 to 3, at least 1 to 2, at least 2 to 3, or at least 1 to 1, at least 1.5 to 1, at least 2 to 1, at least 3 to 1, or at least 5 to 1.

41. The formulation of claim 24, wherein said polyol includes maltitol.
42. The formulation of claim 34 or claim 35, wherein said emulsifier includes lecithin.

43. The formulation of any one of claims 1 to 42, wherein said olive oil, said edible oil, and said at least one flavoring solid are disposed in a substantially homogeneous manner within the formulation.

44. The formulation of any one of claims 1 to 43, wherein the formulation is substantially a phase stable solid food spread at 25°C.

45. The formulation of any one of claims 1 to 44, wherein the formulation is substantially a chemically stable solid food spread at 25°C.

46. The formulation of any one of claims 1 to 45, wherein the edible spread formulation is at least partially enveloped by an edible coating material.

47. The formulation of any one of claims 1 to 46, wherein the edible spread formulation is largely enveloped, substantially enveloped, or completely enveloped by an edible coating material.

48. The formulation of claim 46 or claim 47, wherein said edible coating material includes, largely includes, predominantly includes, or consists essentially of a marzipan.

49. The formulation of any one of claims 46 to 48, wherein said edible coating material includes, largely includes, predominantly includes, or consists essentially of nuts.

50. The formulation of any one of claims 46 to 49, wherein said edible coating material includes, largely includes, predominantly includes, or consists essentially of chocolate.

51. The formulation of any one of claims 1 to 50, wherein said edible oil includes, largely includes, predominantly includes, or consists essentially of olive oil.
52. The formulation of any one of claims 1 to 51, the formulation containing added nutritional fiber.

53. The formulation of any one of claims 1 to 51, the formulation containing at least 2%, at least 4%, at least 6%, or at least 8% added nutritional fiber.

54. The formulation of any one of claims 1 to 53, the formulation containing at least 2%, at least 4%, at least 6%, or at least 8% of a flour.

55. The formulation of any one of claims 1 to 51, wherein a total weight content of a nutritional fiber and a flour within the formulation is at least 2%, at least 4%, at least 6%, or at least 8%.

56. The formulation of any one of claims 1 to 51, wherein a total weight content of a nutritional fiber and a flour within the formulation is at least 2%, at least 4%, at least 6%, or at least 8%, and up to 24%, up to 22%, or up to 20%.

57. The formulation of any one of claims 1 to 56, wherein said hardening agent includes a fat powder.

58. The formulation of claim 57, wherein said fat powder contains at least 90%, at least 95%, at least 98%, or at least 99% saturated fats.

59. The formulation of claim 57 or claim 58, wherein said fat powder has a solid fat content of at least 90%, at least 95%, at least 96%, or at least 97%, at 20°C.

60. The formulation of any one of claims 57 to 59, wherein said fat powder has a solid fat content of at least 70%, at least 80%, at least 85%, or at least 90%, at 50°C.

61. The formulation of any one of claims 57 to 60, wherein said fat powder has a solid fat content of up to 20%, up to 10%, up to 5%, or up to 3%, at 60°C.

62. The formulation of any one of claims 1 to 61, the formulation being free or substantially free of preservatives or artificial preservatives.
63. An edible spread formulation comprising:
(a) at least 6% olive oil by weight;
(b) at least one edible oil, in addition to said olive oil,
the formulation containing a total of 12% to 75%, by weight, of said edible oil and
said olive oil;
(c) 3% to 33%, by weight, of at least one flavoring solid, said flavoring solid
selected from the group consisting of cocoa solids, carob powder, and nut solids or
nut paste; and
(d) at least one sweetener,
said edible oil, said olive oil, said at least one flavoring solid, and said sweetener
intimately mixed within the formulation,
wherein a weight ratio of said at least one flavoring solid to said olive oil within the
formulation is at least 0.4:1,
and wherein the edible spread formulation is a solid at 25°C and atmospheric pressure.

64. The formulation of claim 63, wherein a yield stress of the spread formulation,
at 25°C and atmospheric pressure, is at least 75 Pa, at least 100 Pa, at least 125 Pa, at
least 150 Pa, at least 200 Pa, at least 250 Pa, at least 300 Pa, at least 350 Pa, at least
400 Pa, or at least 500 Pa.

65. A method of producing the edible spread formulation of claim 1, the method
comprising the steps of:
(a) introducing, to a vessel, materials containing said olive oil, a hardening agent,
and said at least one flavoring solid; and
(b) mixing contents of said vessel, whereby said olive oil, said hardening agent,
and said at least one flavoring solid, become intimately mixed within the
formulation.

66. The method of claim 65, further comprising the step of enveloping or at least
partially enveloping the spread formulation with an edible coating material.

67. The method of claim 65 or claim 66, further comprising the step of cooling the
spread formulation to, or below, room temperature.
68. The method of claim 67, wherein the step of cooling the spread formulation is performed prior to the step of at least partially enveloping the spread formulation.

69. The method of any one of claims 65 to 68, wherein at least a portion of said olive oil is disposed in an olive oil base spread including said hardening agent.

70. The method of claim 69, wherein said hardening agent includes at least one monoacylglycerol and/or diacylglycerol.

71. The method of claim 66 or claim 67, wherein a temperature of said contents of said vessel is maintained above a melting temperature of said olive oil base spread, whereby said spread transforms into a liquid.

72. The method of claim 69, wherein said vessel includes, or consists of, a ball mill.

73. The method of any one of claims 65 to 70, wherein, during said mixing, a temperature of said contents is maintained below 85°C, below 70°C, below 60°C, or below 50°C.

74. The method of any one of claims 65 to 70 and 73, wherein said vessel is, or is part of, a chocolate refiner or conche.
A. CLASSIFICATION OF SUBJECT MATTER

INV. A23D7/005 A23D9/007

ADD.

According to International Patent Classification (IPC) and both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A23D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, FSTA, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>X</td>
<td>wO 2004/017744 AI (ZUMBE ALBERT [CH]; NATRACEUTICAL S A [ES]) 4 March 2004 (2004-03-04) examples 3, 4</td>
<td>1-74</td>
</tr>
<tr>
<td>A</td>
<td>DE 103 56 441 AI (MUELLER FRANK J [DE]; MUELLER URSULA [DE]) 14 April 2005 (2005-04-14) claims</td>
<td>1-74</td>
</tr>
<tr>
<td>A</td>
<td>wO 00/40095 AI (EHRLICH MENACHEM [IL]; FRI EDMAN MARK M [IL]; EGER SHAUL [IL]; NEEMAN I) 13 July 2000 (2000-07-13) claims</td>
<td>1-74</td>
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Date of the actual completion of the international search

16 June 2011

Name and mailing address of the ISA/

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Date of mailing of the international search report

28/06/2011

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Merkl, Bernhard
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<th>Publication date</th>
<th>Patent family member(s)</th>
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<tbody>
<tr>
<td>Wo 2004017744 AI</td>
<td>04-03-2004</td>
<td>AU 2003266369 AI</td>
<td>11-03-2004</td>
</tr>
<tr>
<td>DE 10356441 AI</td>
<td>14-04-2005</td>
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<td></td>
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<td>Wo 0040095 AI</td>
<td>13-07-2000</td>
<td>AT 345693 T</td>
<td>15-12-2006</td>
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<tr>
<td></td>
<td></td>
<td>AU 761177 B2</td>
<td>29-05-2003</td>
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<tr>
<td></td>
<td></td>
<td>AU 2716300 A</td>
<td>24-07-2000</td>
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<td></td>
<td>BR 0010868 A</td>
<td>03-12-2002</td>
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<td></td>
<td></td>
<td>CA 2355851 AI</td>
<td>13-07-2000</td>
</tr>
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<td></td>
<td>CN 1332609 A</td>
<td>23-01-2002</td>
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<td></td>
<td></td>
<td>EP 1139771 AI</td>
<td>10-10-2001</td>
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<td></td>
<td>ES 2276544 T3</td>
<td>16-06-2007</td>
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<td>IL 143792 A</td>
<td>15-12-2004</td>
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<td>JP 4187932 B2</td>
<td>26-11-2008</td>
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<td>JP 2002534070 T</td>
<td>15-10-2002</td>
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<td>MX PA01005825 A</td>
<td>19-04-2005</td>
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<td>NZ 512159 A</td>
<td>29-08-2003</td>
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