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(54) Title: PERSONAL CARE COMPOSITIONS COMPRISING AN ANTI-IRRITATION AGENT

(57) Abstract: A personal care composition comprising an anti-irritation agent such as a zinc pyrithione, a zinc salt or a combination thereof.

PERSONAL CARE COMPOSITIONS COMPRISING AN ANTI-IRRITATION AGENT

BACKGROUND OF THE INVENTION

Manufacturers of skin care compositions have made many attempts to incorporate various ingredients into their products to provide benefits such as anti-aging; skin health; anti-inflammation. The ingredients mentioned for these types of purposes are many and the disclosures of such use are prolific. *See e.g.* U.S. Patent Publ. Nos. 2010/0055138; 2009/123576; 2008/0069784; 2008/0199533; 2008/0003188; 2007/0274932; 2006/0257386; 2006/0165643; 2005/0019356; 2002/0022040; and 2002/0197228. Another recent disclosure purports to measure methods of reducing skin irritation via IL1- α reduction testing. *See* U.S. Patent Publ. No. 2007/0224154 in Table 1; *see also* U.S. Patent No. 4,343,798. Other compositions comprising irritation impacting ingredients have also been described. *See e.g.* WO Pub No. 2011/085053.

SUMMARY OF THE INVENTION

One aspect of the present invention provides for a personal care composition which is suitable for various uses including but not limited to facial or body moisturizers and lotions, and so forth, said personal care composition comprising: from 0.01% to 5% of an anti-irritation agent comprising a zinc pyrithione, a zinc salt, or a combination thereof; and from about 50% to about 99.99% of a carrier.

Another aspect of the present invention provides for a method of use by applying a personal care composition of the present invention onto skin to form a treated surface.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a table of various examples in accordance with the present invention.

FIG. 2 is another table of various examples in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

1. Anti-irritation Agent

In one embodiment the moisturizing personal care composition of the present invention further comprises an anti-irritation agent. The anti-irritation agent can be pyrithione or a polyvalent metal salt of pyrithione, or a mixture thereof. Any form of polyvalent metal pyrithione salts may be used, including platelet and needle structures. Preferred salts for use herein include those formed from the polyvalent metals magnesium, barium, bismuth, strontium, copper, zinc,

cadmium, zirconium and mixtures thereof, more preferably zinc. Even more preferred for use herein is the zinc salt of 1-hydroxy-2-pyridinethione (known as “zinc pyrithione” or “ZPT”); more preferably ZPT in platelet particle form, wherein the particles have an average size of up to about 20 μ m, preferably up to about 5 μ m, more preferably up to about 2.5 μ m.

5 The platelet ZPT includes a median particle diameter of about 0.5 microns to about 10, alternatively about 1 to about 5 microns, and alternatively about 3 microns; a mean particle diameter of about 0.5 to about 10 microns, alternatively about 1 to about 5 microns, alternatively about 2 to about 4 microns, and alternatively about 3 microns, and a thickness of about 0.6 to about 15 microns, alternatively about 0.6 to 1 micron, alternatively about 0.6 to about 0.8, and
10 alternatively about 0.6 to about 0.7 microns. The platelet ZPT can also have a span of less than about 5, and alternatively about 1.

Pyridinethione anti-microbial and anti-dandruff agents are described, for example, in U.S. Pat. No. 2,809,971; U.S. Pat. No. 3,236,733; U.S. Pat. No. 3,753,196; U.S. Pat. No. 3,761,418; U.S. Pat. No. 4,345,080; U.S. Pat. No. 4,323,683; U.S. Pat. No. 4,379,753; and U.S. Pat. No.
15 4,470,982. Those of skill in the art will understand that the anti-irritation agent of the present invention can also have other benefits which may be desirable from a skin care composition.

Preferred embodiments include from 0.01% to 5% of an anti-irritation agent; alternatively from 0.05% to 2%, alternatively from 0.1% to 1%, alternatively from 0.2% to about 0.7%, alternatively about 0.5%.

20 The composition of the present invention optionally includes an effective amount of a zinc salt. Preferred embodiments of the present invention include an effective amount of a zinc salt having an aqueous solubility within the composition of less than about 25%, by weight, at 25°C, more preferably less than about 20%, more preferably less than about 15%. Preferred embodiments of the present invention include from 0.001% to 10% of a zinc salt, more preferably
25 from 0.01% to 5%, more preferably still from 0.1% to 3%. In a preferred embodiment, the zinc salt has an average particle size of from 100 nm to 30 μ m.

Examples of zinc salts useful in certain embodiments of the present invention include the following: Zinc aluminate, Zinc carbonate, Zinc oxide and materials containing zinc oxide (i.e., calamine), Zinc phosphates (i.e., orthophosphate and pyrophosphate), Zinc selenide, Zinc
30 sulfide, Zinc silicates (i.e., ortho- and meta-zinc silicates), Zinc silicofluoride, Zinc Borate, Zinc hydroxide and hydroxy sulfate, zinc-containing layered materials and combinations thereof.

In embodiments having an anti-irritation agent and a zinc salt, the ratio of zinc salt to anti-irritation agent is preferably from 5:100 to 5:1; more preferably from about 2:10 to 3:1; more preferably still from 1:2 to 2:1.

Those of skill in the art will understand that the anti-irritation agent of the present invention can also have other benefits which may be desirable from a skin care composition, including but not limited to malodor control and/or anti-bacterial benefits depending on whether the composition is left on skin or rinsed off.

Without intending to be bound by theory, it is believed that these anti-irritation agents can provide various benefits including reduction or control of irritation as well as certain malodor control. In one embodiment, the composition further comprises other agents such as malodor control agents. The malodor active of the present invention is capable of providing an antimicrobial benefit. Such malodor actives are capable of destroying microbes, preventing the development of microbes or preventing the pathogenic action of microbes. A safe and effective amount of a malodor active may be added to the intimate cleansing product, at from about 0.001% to about 10%, or from about 0.01% to about 5%, or from about 0.05% to about 2%, or from about 0.1% to about 1%, or from about 0.3% to about 0.7%, or about 0.5% by weight of the composition.

Examples of malodor actives include β -lactam drugs, quinolone drugs, ciprofloxacin, norfloxacin, tetracycline, erythromycin, amikacin, 2,4,4'-trichloro-2'-hydroxy diphenyl ether, 3,4,4'-trichlorobanilide, phenoxyethanol, phenoxy propanol, phenoxyisopropanol, doxycycline, capreomycin, chlorhexidine, chlortetracycline, oxytetracycline, clindamycin, ethambutol, hexamidine isethionate, metronidazole, pentamidine, gentamicin, kanamycin, lineomycin, methacycline, methenamine, minocycline, neomycin, netilmicin, paromomycin, streptomycin, tobramycin, miconazole, tetracycline hydrochloride, erythromycin, zinc erythromycin, erythromycin estolate, erythromycin stearate, amikacin sulfate, doxycycline hydrochloride, capreomycin sulfate, chlorhexidine gluconate, chlorhexidine hydrochloride, chlortetracycline hydrochloride, oxytetracycline hydrochloride, clindamycin hydrochloride, ethambutol hydrochloride, metronidazole hydrochloride, pentamidine hydrochloride, gentamicin sulfate, kanamycin sulfate, lineomycin hydrochloride, methacycline hydrochloride, methenamine hippurate, methenamine mandelate, minocycline hydrochloride, neomycin sulfate, netilmicin sulfate, paromomycin sulfate, streptomycin sulfate, tobramycin sulfate, miconazole hydrochloride, ketaconazole, amanfadinine hydrochloride, amanfadinine sulfate, octopirox, parachlorometa xylenol, nystatin, tolnaftate, clotrimazole, and mixtures thereof.

2. Optional Skin Care Actives

In one embodiment, the personal care composition further comprises one or more additional skin care actives which are commonly used in cosmetic and personal care compositions on the market today. Each of the one or more optional skin care actives can be provided at from about 0.001% to about 10%, or from about 0.1% to about 5% by weight of the composition. Non-limiting examples of suitable actives include one or more of: Bisabolol and Ginger root; sodium polyethylene glycol 7 olive oil carboxylate; Lauryl p-Cresol Ketoxime, 4-(1-Phenylethyl)1,3-benzenediol, Lupin (*Lupinus albus*) oil & wheat (*Triticum vulgare*) germ oil unsaponifiables, Hydrolyzed lupin protein, Extract of L-lysine and L-arginine peptides, Oil soluble vitamin C, *Evodia rutaecarpa* fruit extract, Zinc pidolate and zinc PCA, Alpha-linoleic acid, p-thymol, and combinations thereof; at least one additional skin and/or hair care active selected from the group consisting of sugar amines, vitamin B₃, retinoids, hydroquinone, peptides, farnesol, phytosterol, dialkanoyl hydroxyproline, hexamidine, salicylic acid, N-acyl amino acid compounds, sunscreen actives, water soluble vitamins, oil soluble vitamins, hesperedin, mustard seed extract, glycyrrhizic acid, glycyrrhetic acid, carnosine, Butylated Hydroxytoluene (BHT) and Butylated Hydroxyanisole (BHA), menthyl anthranilate, cetyl pyridinium chloride, tetrahydrocurmin, vanillin or its derivatives, ergothioneine, melanostatine, sterol esters, idebenone, dehydroacetic acid, Licohalcone A, creatine, creatinine, feverfew extract, yeast extract (e.g., Pitera®), beta glucans, alpha glucans, diethylhexyl syringylidene malonate, erythritol, p-cymen-7-ol, benzyl phenylacetate, 4-(4-methoxyphenyl)butan-2-one, ethoxyquin, tannic acid, gallic acid, octadecenedioic acid, p-cymen-5-ol, methyl sulfonyl methane, an avenathramide compound, fatty acids (especially poly-unsaturated fatty acids), anti-fungal agents, thiol compounds (e.g., N-acetyl cysteine, glutathione, thioglycolate), other vitamins (vitamin B 12), beta-carotene, ubiquinone, amino acids, their salts, their derivatives, their precursors, and/or combinations thereof, such as Bisabolol and Ginger root; sodium polyethylene glycol 7 olive oil carboxylate and/or a menthol or menthol derivative; and a dermatologically acceptable carrier. These and other potentially suitable actives are described in greater detail in U.S. Patent Publication No. 2008/0069784.

In another embodiment, the personal care composition further comprising from about 0.001% to about 1% of methyl naphthalenyl ketone. The methyl naphthalenyl ketone can be a 1-(1,2,3,4,5,6,7,8-octahydro-2,3,8,8-tetramethyl-2naphthalenyl)-ethan-1-one molecule or an isomer or derivative thereof. Commercially available as Iso-E-Super from IFF of New York.

In yet another embodiment, the personal care composition further comprising from about 0.001% to about 1%, preferably from about 0.05% to about 0.5% of a cooling agent. Preferred cooling agents but not limited to are menthol, CoolAct 10, menthyl lactate, and combinations thereof.

5 In one embodiment, the personal care composition of the present invention further comprises a multi-active system for down regulating cytokines, such as disclosed in WO 2011085053. Without intending to be bound by theory, it is believed that by including multiple actives the ability of each active to reduce skin inflammation is increased such that the combined use of the multiple actives exceeds the benefit obtained by using each active separately. The
10 multi-active system for down regulating cytokines comprises at least three actives: an extract of *camellia sinensis*, panthenol, and glycyrrhizinate salt, or Bisabolol and Ginger root, and sodium polyethylene glycol 7 olive oil carboxylate. The personal care composition of the present invention comprises from about 0.001% to about 8%, or from about 0.01% to about 5%, or from about 0.1% to about 3%, or from about 0.2% to about 1.5%, or from about 0.25% to about 1.0 %
15 by weight of the multi-active system, by weight.

The multi-active system for down regulating cytokines comprises at least an extract of *camellia sinensis* (such as a white tea extract); panthenol; and glycyrrhizinate salt (such as dipotassium salt). Each of these actives (and any other ingredients in the present invention, are included in a safe and effective amount for topical application. In one embodiment, the level of
20 the extract of *camellia sinensis* is from about 5% to about 50%, alternatively from about 10% to about 25% of said multi-active system. In another embodiment, the level of glycyrrhizinate salt is from about 15% to about 60%, alternatively from about 20% to about 40% of said multi-active system. In yet another embodiment, the level of panthenol is from about 15% to about 80%, alternatively from about 40% to about 70% of said multi-active system.

25 3. Carrier

The personal care compositions of the present invention also comprise a carrier for the multi-active system for down regulating cytokines. The carrier is preferably dermatologically acceptable, meaning that the carrier is suitable for topical application to the keratinous tissue, has good aesthetic properties, is compatible with the actives of the present invention and any other
30 components, and will not cause any safety or toxicity concerns. In one embodiment, the personal care composition comprises from about 50% to about 99.99%, preferably from about 60% to about 99.9%, more preferably from about 70% to about 98%, and even more preferably from about 80% to about 95% of the carrier by weight of the composition.

The carrier can be in a wide variety of forms. For example, emulsion carriers, including, but not limited to, oil-in-water, water-in-oil, water-in-oil-in-water, and oil-in-water-in-silicone emulsions, are useful herein.

Preferred carriers comprise an emulsion such as oil-in-water emulsions and water-in-oil
5 emulsions, e.g., silicone-in-water or water-in-silicone emulsions. As will be understood by the skilled artisan, a given component will distribute primarily into either the water or oil phase, depending on the water solubility/dispensability of the component in the composition. Oil-in-water emulsions are especially preferred.

Emulsions according to the present invention generally contain a solution as described
10 above and a lipid or oil. Lipids and oils may be derived from animals, plants, or petroleum and may be natural or synthetic. Preferred emulsions also contain a humectant, such as glycerin. Emulsions will preferably further contain from about 0.1% to about 10%, more preferably from about 0.2% to about 5%, of an emulsifier, based on the weight of the composition. Emulsifiers may be nonionic, anionic or cationic. The emulsifier can be a polymer, a surfactant or a mixture
15 thereof. Suitable emulsifiers are disclosed in, for example, U.S. Patent 3,755,560, 4,421,769, and McCutcheon's Detergents and Emulsifiers, North American Edition, pages 317-324 (1986).

a. Water-in-Oil emulsion

Water in oil emulsions are characterized as having a continuous hydrophobic, water
insoluble oil phase and a water phase dispersed therein. The "oil phase" can contain oil, silicone
20 or mixtures thereof. The distinction of whether the emulsion is characterized as a water-in-oil or water-in-silicone emulsion is a function of whether the oil phase is composed of primarily oil or silicone. A preferred example of a water-in-silicone emulsion is described below.

1. Continuous silicone phase

Preferred water-in-silicone emulsions of the present invention comprise from about 1% to
25 about 60%, preferably from about 5% to about 40%, more preferably from about 10% to about 30%, by weight of a continuous silicone phase. The continuous silicone phase exists as an external phase that contains or surrounds the discontinuous aqueous phase described hereinafter.

The continuous silicone phase contains a silicone elastomer and/or polyorganosiloxane oil.
The continuous silicone phase of these preferred emulsions comprises between about 50% and
30 about 99.9% by weight of organopolysiloxane oil and less than about 50% by weight of a non-silicone oil. In a preferred embodiment, the continuous silicone phase comprises at least about 50%, preferably from about 60% to about 99.9%, more preferably from about 70% to about 99.9%, and even more preferably from about 80% to about 99.9%, polyorganosiloxane oil by

weight of the continuous silicone phase, and up to about 50% non-silicone oils, preferably less about 40%, more preferably less than about 30%, even more preferably less than about 10%, and still more preferably less than about 2%, by weight of the continuous silicone phase.

2. Polyorganopolysiloxane Oil

5 The organopolysiloxane oil for use in the composition may be volatile, non-volatile, or a mixture of volatile and non-volatile silicones. The term "nonvolatile" as used in this context refers to those silicones that are liquid under ambient conditions and have a flash point (under one atmospheric of pressure) of or greater than about 100°C. The term "volatile" as used in this context refers to all other silicone oils. Suitable organopolysiloxanes can be selected from a wide
10 variety of silicones spanning a broad range of volatilities and viscosities. Examples of suitable organopolysiloxane oils include polyalkylsiloxanes, cyclic polyalkylsiloxanes, and polyalkylarylsiloxanes.

 Suitable polyalkylsiloxanes include polyalkylsiloxanes with viscosities of from about 0.5 to about 1,000,000 centistokes at 25°C. Commercially available polyalkylsiloxanes include
15 polydimethylsiloxanes, which are also known as dimethicones, examples of which include the Vicasil[®] series sold by General Electric Company and the Dow Corning[®] 200 series sold by Dow Corning Corporation. Cyclic polyalkylsiloxanes suitable for use in the composition include those commercially available such as Dow Corning[®] 244, Dow Corning[®] 344 fluid, and Dow Corning[®] 345 fluid.

20 Also useful are materials such as trimethylsiloxysilicate, which is a polymeric material corresponding to the general chemical formula $[(\text{CH}_2)_3\text{SiO}_{1/2}]_x[\text{SiO}_2]_y$, wherein x is an integer of from about 1 to about 500 and y is an integer of from about 1 to about 500. A commercially available trimethylsiloxysilicate is sold as a mixture with dimethicone as DC[®] 593 fluid.

 Dimethiconols are also suitable for use in the composition. These compounds can be
25 represented by the chemical formulas $\text{R}_3\text{SiO}[\text{R}_2\text{SiO}]_x\text{SiR}_2\text{OH}$ and $\text{HOR}_2\text{SiO}[\text{R}_2\text{SiO}]_x\text{SiR}_2\text{OH}$ wherein R is an alkyl group (preferably R is methyl or ethyl) and x is an integer of from 0 to about 500, chosen to achieve the desired molecular weight. Commercially available dimethiconols are typically sold as mixtures with dimethicone or cyclomethicone (e.g. Dow Corning[®] 1401, 1402, and 1403 fluids).

30 Polyalkylaryl siloxanes are also suitable for use in the composition, particularly those having viscosities of from about 15 to about 65 centistokes at 25°C.

Preferred for use herein are organopolysiloxanes selected from the group consisting of polyalkylsiloxanes, alkyl substituted dimethicones, cyclomethicones, trimethylsiloxysilicates, dimethiconols, polyalkylaryl siloxanes, and mixtures thereof. More preferred for use herein are polyalkylsiloxanes and cyclomethicones. Preferred polyalkylsiloxanes are dimethicones.

5 As stated above, the continuous silicone phase may contain one or more non-silicone oils. Suitable non-silicone oils have a melting point of about 25°C or less under about one atmosphere of pressure. Examples of non-silicone oils suitable for use in the continuous silicone phase are known in the chemical arts in topical personal care products which can be in the form of emulsions, e.g., mineral oil, vegetable oils, synthetic oils, semisynthetic oils, fatty acid esters, etc.

10 3. Silicone Elastomer

The compositions of the present invention also include from about 0.1% to about 30%, by weight of the composition, of a silicone elastomer component. Preferably, the composition includes from about 1% to about 30%, more preferably from about 2% to about 20%, by weight of the composition, of the silicone elastomer component.

15 Suitable for use herein are silicone elastomers, which can be emulsifying or non-emulsifying crosslinked siloxane elastomers or mixtures thereof. No specific restriction exists as to the type of curable organopolysiloxane composition that can serve as starting material for the crosslinked organopolysiloxane elastomer. Examples in this respect are addition reaction-curing organopolysiloxane compositions which cure under platinum metal catalysis by the addition
20 reaction between SiH-containing diorganopolysiloxane and organopolysiloxane having silicon-bonded vinyl groups; condensation-curing organopolysiloxane compositions which cure in the presence of an organotin compound by a dehydrogenation reaction between hydroxyl-terminated diorganopolysiloxane and SiH-containing diorganopolysiloxane and condensation-curing organopolysiloxane compositions which cure in the presence of an organotin compound or a
25 titanate ester.

Addition reaction-curing organopolysiloxane compositions are preferred for their rapid curing rates and excellent uniformity of curing. A particularly preferred addition reaction-curing organopolysiloxane composition is prepared from:

- (A) an organopolysiloxane having at least 2 lower alkenyl groups in each molecule;
- 30 (B) an organopolysiloxane having at least 2 silicon-bonded hydrogen atoms in each molecule; and
- (C) a platinum-type catalyst.

In one embodiment the composition includes an emulsifying crosslinked organopolysiloxane elastomer, a non-emulsifying crosslinked organopolysiloxane elastomer, or a mixture thereof. The term “non-emulsifying,” as used herein, defines crosslinked organopolysiloxane elastomers from which polyoxyalkylene units are absent. The term
5 “emulsifying,” as used herein, means crosslinked organopolysiloxane elastomers having at least one polyoxyalkylene (e.g., polyoxyethylene or polyoxypropylene) unit. Preferred emulsifying elastomers herein include polyoxyalkylene modified elastomers formed from divinyl compounds, particularly siloxane polymers with at least two free vinyl groups, reacting with Si-H linkages on a polysiloxane backbone. Preferably, the elastomers are dimethyl polysiloxanes crosslinked by
10 Si-H sites on a molecularly spherical MQ resin. Emulsifying crosslinked organopolysiloxane elastomers can notably be chosen from the crosslinked polymers described in US Patents 5,412,004, 5,837,793, and 5,811,487. An emulsifying elastomer comprising dimethicone copolyol crosspolymer (and) dimethicone is available from Shin Etsu as KSG-21.

Advantageously, the non-emulsifying elastomers are dimethicone/vinyl dimethicone
15 crosspolymers. Such dimethicone/vinyl dimethicone crosspolymers are supplied by a variety of suppliers including Dow Corning (DC 9040 and DC 9041), General Electric (SFE 839), Shin Etsu (KSG-15, 16, 18 [dimethicone/phenyl vinyl dimethicone crosspolymer]), and Grant Industries (GRANSIL™ line of elastomers). Cross-linked organopolysiloxane elastomers useful in the present invention and processes for making them are further described in U.S. Patent
20 4,970,252, U.S. Patent 5,760,116, and U.S. Patent 5,654,362. Additional crosslinked organopolysiloxane elastomers useful in the present invention are disclosed in Japanese Patent Application JP 61-18708, assigned to Pola Kasei Kogyo KK.

Commercially available elastomers preferred for use herein are Dow Corning's 9040
silicone elastomer blend, Shin Etsu's KSG-21, and mixtures thereof.

25

4. Carrier for Silicone Elastomer

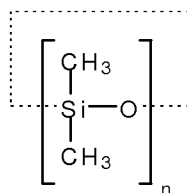
The topical compositions of the present invention include from about 1% to about 80%,
by weight of the composition, of a suitable carrier for the for the crosslinked organopolysiloxane
elastomer component described above. The carrier, when combined with the cross-linked
30 organopolysiloxane elastomer particles of the present invention, serves to suspend and swell the
elastomer particles to provide an elastic, gel-like network or matrix. The carrier for the cross-
linked siloxane elastomer is liquid under ambient conditions, and preferably has a low viscosity
to provide for improved spreading on skin.

Concentrations of the carrier in the cosmetic compositions of the present invention will vary primarily with the type and amount of carrier and the cross-linked siloxane elastomer employed. Preferred concentrations of the carrier are from about 5% to about 50%, more preferably from about 5% to about 40%, by weight of the composition.

5 The carrier for the cross-linked siloxane elastomer includes one or more liquid carriers suitable for topical application to human skin. These liquid carriers may be organic, silicone-containing or fluorine-containing, volatile or non-volatile, polar or non-polar, provided that the liquid carrier forms a solution or other homogenous liquid or liquid dispersion with the selected cross-linked siloxane elastomer at the selected siloxane elastomer concentration at a temperature
10 of from about 28° C. to about 250° C., preferably from about 28° C. to about 100° C., preferably from about 28° C. to about 78° C. The term "volatile" as used herein refers to all materials that are not "non-volatile" as previously defined herein. The phrase "relatively polar" as used herein means more polar than another material in terms of solubility parameter; i.e., the higher the solubility parameter the more polar the liquid. The term "non-polar" typically means that the
15 material has a solubility parameter below about 6.5 (cal/cm³)^{0.5}.

5. Non-polar, Volatile Oils

The non-polar, volatile oil tends to impart highly desirable aesthetic properties to the compositions of the present invention. Consequently, the non-polar, volatile oils are preferably utilized at a fairly high level. Non-polar, volatile oils particularly useful in the present invention
20 are silicone oils; hydrocarbons; and mixtures thereof. Such non-polar, volatile oils are disclosed, for example, in *Cosmetics, Science, and Technology*, Vol. 1, 27-104 edited by Balsam and Sagarin, 1972. Examples of preferred non-polar, volatile hydrocarbons include polydecanes such as isododecane and isodecane (e.g., Permethyl-99A which is available from Presperse Inc.) and the C7 -C8 through C12 -C15 isoparaffins (such as the Isopar Series available from Exxon
25 Chemicals). Particularly preferred volatile silicone oils are selected from cyclic volatile silicones with formula:



wherein n is from about 3 to about 7; and linear volatile silicones with formula:



wherein m is from about 1 to about 7. Linear volatile silicones generally have a viscosity of less than about 5 centistokes at 25° C., whereas the cyclic silicones have viscosities of less than about 10 centistokes at 25° C. Highly preferred examples of volatile silicone oils include cyclomethicones of varying viscosities, e.g., Dow Corning 200, Dow Corning 244, Dow Corning 245, Dow Corning 344, and Dow Corning 345, (from Dow Corning Corp.); SF-1204 and SF-1202 Silicone Fluids (from G.E. Silicones), GE 7207 and 7158 (from General Electric Co.); and SWS-03314 (from SWS Silicones Corp.).

f. Relatively Polar, Non-volatile oils

The non-volatile oil is "relatively polar" as compared to the non-polar, volatile oil discussed above. Therefore, the non-volatile co-carrier is more polar (i.e., has a higher solubility parameter) than at least one of the non-polar, volatile oils. Relatively polar, non-volatile oils potentially useful in the present invention are disclosed, for example, in *Cosmetics, Science, and Technology*, Vol. 1, 27-104 edited by Balsam and Sagarin, 1972; U.S. Patents 4,202,879 and 4,816,261. Relatively polar, non-volatile oils useful in the present invention are preferably selected from silicone oils; hydrocarbon oils; fatty alcohols; fatty acids; esters of mono and dibasic carboxylic acids with mono and polyhydric alcohols; polyoxyethylenes; polyoxypropylenes; mixtures of polyoxyethylene and polyoxypropylene ethers of fatty alcohols; and mixtures thereof.

6. Non-polar, Non-volatile oils

In addition to the liquids discussed above, the carrier for the cross-linked siloxane elastomer may optionally include non-volatile, non-polar oils. Typical non-volatile, non-polar emollients are disclosed, for example, in *Cosmetics, Science, and Technology*, Vol. 1, 27-104 edited by Balsam and Sagarin, 1972; U.S. Patents 4,202,879 and 4,816,261. The non-volatile oils useful in the present invention are essentially non-volatile polysiloxanes, paraffinic hydrocarbon oils, and mixtures thereof.

7. Dispersed aqueous phase

The topical compositions of the present invention comprise from about 30% to about 90%, more preferably from about 50% to about 85%, and even more preferably from about 70% to about 80% of a dispersed aqueous phase. In emulsion technology, the term "dispersed phase" is a term well-known to one skilled in the art which means that the phase exists as small particles or droplets that are suspended in and surrounded by a continuous phase. The dispersed phase is also known as the internal or discontinuous phase. The dispersed aqueous phase is a dispersion of

small aqueous particles or droplets suspended in and surrounded by the continuous silicone phase described hereinbefore.

The aqueous phase can be water, or a combination of water and one or more water soluble or dispersible ingredients. Nonlimiting examples of such optional ingredients include thickeners, acids, bases, salts, chelants, gums, water-soluble or dispersible alcohols and polyols, buffers, preservatives, sunscreens, agents, colorings, and the like.

The topical compositions of the present invention will typically comprise from about 25% to about 90%, preferably from about 40% to about 85%, more preferably from about 60% to about 80%, water in the dispersed aqueous phase by weight.

10 8. Emulsifier for dispersing the aqueous phase

The water-in-silicone emulsions of the present invention preferably comprise an emulsifier. In one embodiment, the composition contains from about 0.1% to about 10% emulsifier, more preferably from about 0.2% to about 7.5%, even more preferably from about 0.5% to about 5%, emulsifier by weight of the composition. The emulsifier helps disperse and suspend the aqueous phase within the continuous silicone phase.

A wide variety of emulsifying agents can be employed herein to form the preferred water-in-silicone emulsion. Known or conventional emulsifying agents can be used in the composition, provided that the selected emulsifying agent is chemically and physically compatible with essential components of the composition, and provides the desired dispersion characteristics. Suitable emulsifiers include silicone emulsifiers, non-silicon-containing emulsifiers, and mixtures thereof, known by those skilled in the art for use in topical personal care products. Preferably these emulsifiers have an HLB value of less than about 14, more preferably from about 2 to about 14, and even more preferably from about 4 to about 14. Emulsifiers having an HLB value outside of these ranges can be used in combination with other emulsifiers to achieve an effective weighted average HLB for the combination that falls within these ranges.

Silicone emulsifiers are preferred. A wide variety of silicone emulsifiers are useful herein. These silicone emulsifiers are typically organically modified organopolysiloxanes, also known to those skilled in the art as silicone surfactants. Useful silicone emulsifiers include dimethicone copolyols.

Nonlimiting examples of dimethicone copolyols and other silicone surfactants useful as emulsifiers herein include polydimethylsiloxane polyether copolymers with pendant polyethylene oxide side chains, polydimethylsiloxane polyether copolymers with pendant polypropylene oxide side chains, polydimethylsiloxane polyether copolymers with pendant mixed polyethylene oxide

and polypropylene oxide side chains, polydimethylsiloxane polyether copolymers with pendant mixed poly(ethylene)(propylene)oxide side chains, polydimethylsiloxane polyether copolymers with pendant organobetaine side chains, polydimethylsiloxane polyether copolymers with pendant carboxylate side chains, polydimethylsiloxane polyether copolymers with pendant quaternary ammonium side chains; and also further modifications of the preceding copolymers containing pendant C2-C30 straight, branched, or cyclic alkyl moieties. Examples of commercially available dimethicone copolyols useful herein sold by Dow Corning Corporation are Dow Corning[®] 190, 193, Q2-5220, 2501 Wax, 2-5324 fluid, and 3225C (this latter material being sold as a mixture with cyclomethicone). Cetyl dimethicone copolyol is commercially available as a mixture with polyglyceryl-4 isostearate (and) hexyl laurate and is sold under the tradename ABIL[®] WE-09 (available from Goldschmidt). Cetyl dimethicone copolyol is also commercially available as a mixture with hexyl laurate (and) polyglyceryl-3 oleate (and) cetyl dimethicone and is sold under the tradename ABIL[®] WS-08 (also available from Goldschmidt). Other nonlimiting examples of dimethicone copolyols also include lauryl dimethicone copolyol, dimethicone copolyol acetate, dimethicone copolyol adipate, dimethicone copolyolamine, dimethicone copolyol behenate, dimethicone copolyol butyl ether, dimethicone copolyol hydroxy stearate, dimethicone copolyol isostearate, dimethicone copolyol laurate, dimethicone copolyol methyl ether, dimethicone copolyol phosphate, and dimethicone copolyol stearate.

Among the non-silicone-containing emulsifiers useful herein are various non-ionic and anionic emulsifying agents such as sugar esters and polyesters, alkoxyated sugar esters and polyesters, C1-C30 fatty acid esters of C1-C30 fatty alcohols, alkoxyated derivatives of C1-C30 fatty acid esters of C1-C30 fatty alcohols, alkoxyated ethers of C1-C30 fatty alcohols, polyglyceryl esters of C1-C30 fatty acids, C1-C30 esters of polyols, C1-C30 ethers of polyols, alkyl phosphates, polyoxyalkylene fatty ether phosphates, fatty acid amides, acyl lactylates, soaps, and mixtures thereof. Other suitable emulsifiers are described, for example, in McCutcheon's, Detergents and Emulsifiers, North American Edition (1986), published by Allured Publishing Corporation; U.S. Patent Nos. 5,011,681, 4,421,769, and 3,755,560.

b. Oil-in-Water Emulsions

Other preferred topical carriers include oil-in-water emulsions, having a continuous aqueous phase and a hydrophobic, water-insoluble phase ("oil phase") dispersed therein. The "oil phase" can contain oil, silicone or mixtures thereof, and includes but is not limited to the oils and silicones described above in the section on water-in-oil emulsions. The distinction of whether the emulsion is characterized as an oil-in-water or silicone-in-water emulsions is a function of

whether the oil phase is composed of primarily oil or silicone. The water phase of these emulsions consists primarily of water, but can also contain various other ingredients such as those water phase ingredients listed in the above section on water-in-oil emulsion. The preferred oil-in-water emulsions comprises from about 25% to about 98%, preferably from about 65% to about 5 95%, more preferably from about 70% to about 90% water by weight of the total composition.

In addition to a continuous water phase and dispersed oil or silicone phase, these oil-in-water compositions also comprise an emulsifier to stabilize the emulsion. Emulsifiers useful herein are well known in the art, and include nonionic, anionic, cationic, and amphoteric emulsifiers. Non-limiting examples of emulsifiers useful in the oil-in-water emulsions of this 10 invention are given in McCutcheon's, Detergents and Emulsifiers, North American Edition (1986), published by Allured Publishing Corporation; U.S. Patent 5,011,681; U.S. Patent 4,421,769; and U.S. Patent 3,755,560.

1. Structuring Agent

A preferred oil-in-water emulsion contains a structuring agent to assist in the formation of 15 a liquid crystalline gel network structure. Without being limited by theory, it is believed that the structuring agent assists in providing rheological characteristics to the composition which contribute to the stability of the composition. The structuring agent may also function as an emulsifier or surfactant. Preferred compositions of this invention contain from about 0.5% to about 20%, more preferably from about 1% to about 10%, even more preferably from about 1% 20 to about 5%, by weight of the composition, of a structuring agent.

The preferred structuring agents of the present invention include stearic acid, palmitic acid, stearyl alcohol, cetyl alcohol, behenyl alcohol, stearic acid, palmitic acid, the polyethylene glycol ether of stearyl alcohol having an average of about 1 to about 21 ethylene oxide units, the polyethylene glycol ether of cetyl alcohol having an average of about 1 to about 5 ethylene oxide 25 units, and mixtures thereof. More preferred structuring agents of the present invention are selected from stearyl alcohol, cetyl alcohol, behenyl alcohol, the polyethylene glycol ether of stearyl alcohol having an average of about 2 ethylene oxide units (steareth-2), the polyethylene glycol ether of stearyl alcohol having an average of about 21 ethylene oxide units (steareth-21), the polyethylene glycol ether of cetyl alcohol having an average of about 2 ethylene oxide, 30 and mixtures thereof. Even more preferred structuring agents are selected from stearic acid, palmitic acid, stearyl alcohol, cetyl alcohol, behenyl alcohol, steareth-2, steareth-21, and mixtures thereof.

2. Hydrophilic surfactant

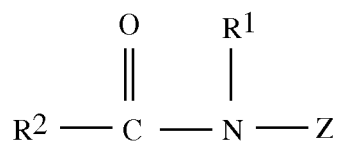
The preferred oil-in-water emulsions contain from about 0.05% to about 10%, preferably from about 1% to about 6%, and more preferably from about 1% to about 3% of at least one hydrophilic surfactant which can disperse the hydrophobic materials in the water phase (percentages by weight of the topical carrier). The surfactant, at a minimum, must be hydrophilic
5 enough to disperse in water.

Preferred hydrophilic surfactants are selected from nonionic surfactants. Among the nonionic surfactants that are useful herein are those that can be broadly defined as condensation products of long chain alcohols, e.g. C8-30 alcohols, with sugar or starch polymers, i.e., glycosides. These compounds can be represented by the formula $(S)_n-O-R$ wherein S is a sugar
10 moiety such as glucose, fructose, mannose, and galactose; n is an integer of from about 1 to about 1000, and R is a C8-30 alkyl group. Examples of long chain alcohols from which the alkyl group can be derived include decyl alcohol, cetyl alcohol, stearyl alcohol, lauryl alcohol, myristyl alcohol, oleyl alcohol, and the like. Preferred examples of these surfactants include those wherein S is a glucose moiety, R is a C8-20 alkyl group, and n is an integer of from about 1 to
15 about 9. Commercially available examples of these surfactants include decyl polyglucoside (available as APG 325 CS from Henkel) and lauryl polyglucoside (available as APG 600 CS and 625 CS from Henkel).

Other useful nonionic surfactants include the condensation products of alkylene oxides with fatty acids (i.e. alkylene oxide esters of fatty acids). These materials have the general
20 formula $RCO(X)_nOH$ wherein R is a C10-30 alkyl group, X is $-OCH_2CH_2-$ (i.e. derived from ethylene glycol or oxide) or $-OCH_2CHCH_3-$ (i.e. derived from propylene glycol or oxide), and n is an integer from about 6 to about 200. Other nonionic surfactants are the condensation products of alkylene oxides with 2 moles of fatty acids (i.e. alkylene oxide diesters of fatty acids). These materials have the general formula $RCO(X)_nOOCR$ wherein R is a C10-30 alkyl
25 group, X is $-OCH_2CH_2-$ (i.e. derived from ethylene glycol or oxide) or $-OCH_2CHCH_3-$ (i.e. derived from propylene glycol or oxide), and n is an integer from about 6 to about 100. Other nonionic surfactants are the condensation products of alkylene oxides with fatty alcohols (i.e. alkylene oxide ethers of fatty alcohols). These materials have the general formula $R(X)_nOR'$ wherein R is a C10-30 alkyl group, X is $-OCH_2CH_2-$ (i.e. derived from ethylene glycol or oxide)
30 or $-OCH_2CHCH_3-$ (i.e. derived from propylene glycol or oxide), and n is an integer from about 6 to about 100 and R' is H or a C10-30 alkyl group. Still other nonionic surfactants are the condensation products of alkylene oxides with both fatty acids and fatty alcohols [i.e. wherein the

polyalkylene oxide portion is esterified on one end with a fatty acid and etherified (i.e. connected via an ether linkage) on the other end with a fatty alcohol]. These materials have the general formula $\text{RCO}(\text{X})_n\text{OR}'$ wherein R and R' are C10-30 alkyl groups, X is $-\text{OCH}_2\text{CH}_2-$ (i.e. derived from ethylene glycol or oxide) or $-\text{OCH}_2\text{CHCH}_3-$ (derived from propylene glycol or oxide), and n is an integer from about 6 to about 100. Nonlimiting examples of these alkylene oxide derived nonionic surfactants include ceteth-6, ceteth-10, ceteth-12, cetareth-6, cetareth-10, cetareth-12, steareth-6, steareth-10, steareth-12, steareth-21, PEG-6 stearate, PEG-10 stearate, PEG-100 stearate, PEG-12 stearate, PEG-20 glyceryl stearate, PEG-80 glyceryl tallowate, PEG-10 glyceryl stearate, PEG-30 glyceryl cocoate, PEG-80 glyceryl cocoate, PEG-200 glyceryl tallowate, PEG-8 dilaurate, PEG-10 distearate, and mixtures thereof.

Still other useful nonionic surfactants include polyhydroxy fatty acid amide surfactants corresponding to the structural formula:



15

wherein: R¹ is H, C₁-C₄ alkyl, 2-hydroxyethyl, 2-hydroxy-propyl, preferably C₁-C₄ alkyl, more preferably methyl or ethyl, most preferably methyl; R² is C₅-C₃₁ alkyl or alkenyl, preferably C₇-C₁₉ alkyl or alkenyl, more preferably C₉-C₁₇ alkyl or alkenyl, most preferably C₁₁-C₁₅ alkyl or alkenyl; and Z is a polyhydroxyhydrocarbonyl moiety having a linear hydrocarbonyl chain with a least 3 hydroxyls directly connected to the chain, or an alkoxyated derivative (preferably ethoxyated or propoxyated) thereof. Z preferably is a sugar moiety selected from the group consisting of glucose, fructose, maltose, lactose, galactose, mannose, xylose, and mixtures thereof. An especially preferred surfactant corresponding to the above structure is coconut alkyl N-methyl glucoside amide (i.e., wherein the R²CO- moiety is derived from coconut oil fatty acids). Processes for making compositions containing polyhydroxy fatty acid amides are disclosed, for example, in G.B. Patent Specification 809,060, published February 18, 1959, by Thomas Hedley & Co., Ltd.; U.S. Patent No. 2,965,576, to E. R. Wilson, issued December 20, 1960; U.S. Patent No. 2,703,798, to A. M. Schwartz, issued March 8, 1955; and U.S. Patent No. 1,985,424, to Piggott, issued December 25, 1934.

Preferred among the nonionic surfactants are those selected from the group consisting of steareth-21, cetareth-20, cetareth-12, sucrose cocoate, steareth-100, PEG-100 stearate, and mixtures thereof.

Other nonionic surfactants suitable for use herein include sugar esters and polyesters, 5 alkoxyated sugar esters and polyesters, C1-C30 fatty acid esters of C1-C30 fatty alcohols, alkoxyated derivatives of C1-C30 fatty acid esters of C1-C30 fatty alcohols, alkoxyated ethers of C1-C30 fatty alcohols, polyglyceryl esters of C1-C30 fatty acids, C1-C30 esters of polyols, C1-C30 ethers of polyols, alkyl phosphates, polyoxyalkylene fatty ether phosphates, fatty acid amides, acyl lactylates, and mixtures thereof. Nonlimiting examples of these emulsifiers include: 10 polyethylene glycol 20 sorbitan monolaurate (Polysorbate 20), polyethylene glycol 5 soya sterol, Steareth-20, Cetareth-20, PPG-2 methyl glucose ether distearate, Ceteth-10, Polysorbate 80, cetyl phosphate, potassium cetyl phosphate, diethanolamine cetyl phosphate, Polysorbate 60, glyceryl stearate, polyoxyethylene 20 sorbitan trioleate (Polysorbate 85), sorbitan monolaurate, polyoxyethylene 4 lauryl ether sodium stearate, polyglyceryl-4 isostearate, hexyl laurate, PPG-2 15 methyl glucose ether distearate, PEG-100 stearate, and mixtures thereof.

Another group of non-ionic surfactants useful herein are fatty acid ester blends based on a mixture of sorbitan or sorbitol fatty acid ester and sucrose fatty acid ester, the fatty acid in each instance being preferably C₈-C₂₄, more preferably C₁₀-C₂₀. The preferred fatty acid ester emulsifier is a blend of sorbitan or sorbitol C₁₆-C₂₀ fatty acid ester with sucrose C₁₀-C₁₆ fatty 20 acid ester, especially sorbitan stearate and sucrose cocoate. This is commercially available from ICI under the trade name Arlatone 2121.

Other suitable surfactants useful herein include a wide variety of cationic, anionic, zwitterionic, and amphoteric surfactants such as are known in the art and discussed more fully below. See, e.g., McCutcheon's, Detergents and Emulsifiers, North American Edition (1986), 25 published by Allured Publishing Corporation; U.S. Patent No. 5,011,681 to Ciotti et al., issued April 30, 1991; U.S. Patent No. 4,421,769 to Dixon et al., issued December 20, 1983; and U.S. Patent No. 3,755,560 to Dickert et al., issued August 28, 1973. The hydrophilic surfactants useful herein can contain a single surfactant, or any combination of suitable surfactants. The exact surfactant (or surfactants) chosen will depend upon the pH of the composition and the other 30 components present.

Also useful herein are cationic surfactants, especially dialkyl quaternary ammonium compounds, examples of which are described in U.S. Patent 5,151,209; U.S. Patent 5,151,210; U.S. Patent 5,120,532; U.S. Patent 4,387,090; U.S. Patent 3,155,591; U.S. Patent 3,929,678; U.S.

Patent 3,959,461; McCutcheon's, Detergents & Emulsifiers, (North American edition 1979) M.C. Publishing Co.; and Schwartz, et al., Surface Active Agents, Their Chemistry and Technology, New York: Interscience Publishers, 1949. The cationic surfactants useful herein include cationic ammonium salts such as those having the formula:



wherein R₁, is an alkyl group having from about 12 to about 30 carbon atoms, or an aromatic, aryl or alkaryl group having from about 12 to about 30 carbon atoms; R₂, R₃, and R₄ are independently selected from hydrogen, an alkyl group having from about 1 to about 22 carbon atoms, or aromatic, aryl or alkaryl groups having from about 12 to about 22 carbon atoms; and X is any compatible anion, preferably selected from chloride, bromide, iodide, acetate, phosphate, nitrate, sulfate, methyl sulfate, ethyl sulfate, tosylate, lactate, citrate, glycolate, and mixtures thereof. Additionally, the alkyl groups of R₁, R₂, R₃, and R₄ can also contain ester and/or ether linkages, or hydroxy or amino group substituents (e.g., the alkyl groups can contain polyethylene glycol and polypropylene glycol moieties).

More preferably, R₁ is an alkyl group having from about 12 to about 22 carbon atoms; R₂ is selected from H or an alkyl group having from about 1 to about 22 carbon atoms; R₃ and R₄ are independently selected from H or an alkyl group having from about 1 to about 3 carbon atoms; and X is as described previously.

Still more preferably, R₁ is an alkyl group having from about 12 to about 22 carbon atoms; R₂, R₃, and R₄ are selected from H or an alkyl group having from about 1 to about 3 carbon atoms; and X is as described previously.

Alternatively, other useful cationic emulsifiers include amino-amides, wherein in the above structure R₁ is alternatively R₅CONH-(CH₂)_n, wherein R₅ is an alkyl group having from about 12 to about 22 carbon atoms, and n is an integer from about 2 to about 6, more preferably from about 2 to about 4, and still more preferably from about 2 to about 3. Nonlimiting examples of these cationic emulsifiers include stearamidopropyl PG-dimonium chloride phosphate, behenamidopropyl PG dimonium chloride, stearamidopropyl ethyldimonium ethosulfate, stearamidopropyl dimethyl (myristyl acetate) ammonium chloride, stearamidopropyl dimethyl ceteryl ammonium tosylate, stearamidopropyl dimethyl ammonium chloride, stearamidopropyl

dimethyl ammonium lactate, and mixtures thereof. Especially preferred is behenamidopropyl PG dimonium chloride.

Nonlimiting examples of quaternary ammonium salt cationic surfactants include those selected from cetyl ammonium chloride, cetyl ammonium bromide, lauryl ammonium chloride, lauryl ammonium bromide, stearyl ammonium chloride, stearyl ammonium bromide, cetyl dimethyl ammonium chloride, cetyl dimethyl ammonium bromide, lauryl dimethyl ammonium chloride, lauryl dimethyl ammonium bromide, stearyl dimethyl ammonium chloride, stearyl dimethyl ammonium bromide, cetyl trimethyl ammonium chloride, cetyl trimethyl ammonium bromide, lauryl trimethyl ammonium chloride, lauryl trimethyl ammonium bromide, stearyl trimethyl ammonium chloride, stearyl trimethyl ammonium bromide, lauryl dimethyl ammonium chloride, stearyl dimethyl cetyl ditallow dimethyl ammonium chloride, dicetyl ammonium chloride, dicetyl ammonium bromide, dilauryl ammonium chloride, dilauryl ammonium bromide, distearyl ammonium chloride, distearyl ammonium bromide, dicetyl methyl ammonium chloride, dicetyl methyl ammonium bromide, dilauryl methyl ammonium chloride, dilauryl methyl ammonium bromide, distearyl methyl ammonium chloride, distearyl methyl ammonium bromide, and mixtures thereof. Additional quaternary ammonium salts include those wherein the C₁₂ to C₃₀ alkyl carbon chain is derived from a tallow fatty acid or from a coconut fatty acid. The term "tallow" refers to an alkyl group derived from tallow fatty acids (usually hydrogenated tallow fatty acids), which generally have mixtures of alkyl chains in the C₁₆ to C₁₈ range. The term "coconut" refers to an alkyl group derived from a coconut fatty acid, which generally have mixtures of alkyl chains in the C₁₂ to C₁₄ range. Examples of quaternary ammonium salts derived from these tallow and coconut sources include ditallow dimethyl ammonium chloride, ditallow dimethyl ammonium methyl sulfate, di(hydrogenated tallow) dimethyl ammonium chloride, di(hydrogenated tallow) dimethyl ammonium acetate, ditallow dipropyl ammonium phosphate, ditallow dimethyl ammonium nitrate, di(coconutalkyl)dimethyl ammonium chloride, di(coconutalkyl)dimethyl ammonium bromide, tallow ammonium chloride, coconut ammonium chloride, stearamidopropyl PG-dimonium chloride phosphate, stearamidopropyl ethyldimonium ethosulfate, stearamidopropyl dimethyl (myristyl acetate) ammonium chloride, stearamidopropyl dimethyl ceteryl ammonium tosylate, stearamidopropyl dimethyl ammonium chloride, stearamidopropyl dimethyl ammonium lactate, and mixtures thereof. An example of a quaternary ammonium compound having an alkyl group with an ester linkage is ditallowyl oxyethyl dimethyl ammonium chloride.

More preferred cationic surfactants are those selected from behenamidopropyl PG dimonium chloride, dilauryl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, dimyristyl dimethyl ammonium chloride, dipalmityl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, stearamidopropyl PG-dimonium chloride phosphate, 5 stearamidopropyl ethyldiammonium ethosulfate, stearamidopropyl dimethyl (myristyl acetate) ammonium chloride, stearamidopropyl dimethyl cetearyl ammonium tosylate, stearamidopropyl dimethyl ammonium chloride, stearamidopropyl dimethyl ammonium lactate, and mixtures thereof.

Still more preferred cationic surfactants are those selected from behenamidopropyl PG 10 dimonium chloride, dilauryl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, dimyristyl dimethyl ammonium chloride, dipalmityl dimethyl ammonium chloride, and mixtures thereof.

A preferred combination of cationic surfactant and structuring agent is behenamidopropyl PG dimonium chloride and/or behenyl alcohol, wherein the ratio is preferably optimized to 15 maintained to enhance physical and chemical stability, especially when such a combination contains ionic and/or highly polar solvents. This combination is especially useful for delivery of sunscreens agents such as zinc oxide and octyl methoxycinnamate.

A wide variety of anionic surfactants can also be useful herein. See, e.g., U.S. Patent No. 3,929,678, to Laughlin et al., issued December 30, 1975. Nonlimiting examples of anionic 20 surfactants include the alkoyl isethionates, and the alkyl and alkyl ether sulfates. The alkoyl isethionates typically have the formula $\text{RCO-OCH}_2\text{CH}_2\text{SO}_3\text{M}$ wherein R is alkyl or alkenyl of from about 10 to about 30 carbon atoms, and M is a water-soluble cation such as ammonium, sodium, potassium and triethanolamine. Nonlimiting examples of these isethionates include those alkoyl isethionates selected from ammonium cocoyl isethionate, sodium cocoyl isethionate, 25 sodium lauroyl isethionate, sodium stearyl isethionate, and mixtures thereof.

The alkyl and alkyl ether sulfates typically have the respective formulae ROSO_3M and $\text{RO}(\text{C}_2\text{H}_4\text{O})_x\text{SO}_3\text{M}$, wherein R is alkyl or alkenyl of from about 10 to about 30 carbon atoms, x 30 is from about 1 to about 10, and M is a water-soluble cation such as ammonium, sodium, potassium and triethanolamine. Another suitable class of anionic surfactants are the water-soluble salts of the organic, sulfuric acid reaction products of the general formula:



wherein R_1 is chosen from the group including a straight or branched chain, saturated aliphatic hydrocarbon radical having from about 8 to about 24, preferably about 10 to about 16, carbon atoms; and M is a cation. Still other anionic synthetic surfactants include the class designated as succinamates, olefin sulfonates having about 12 to about 24 carbon atoms, and β -alkyloxy alkane sulfonates. Examples of these materials are sodium lauryl sulfate and ammonium lauryl sulfate.

Other anionic materials useful herein are soaps (i.e. alkali metal salts, e.g., sodium or potassium salts) of fatty acids, typically having from about 8 to about 24 carbon atoms, preferably from about 10 to about 20 carbon atoms. The fatty acids used in making the soaps can be obtained from natural sources such as, for instance, plant or animal-derived glycerides (e.g., palm oil, coconut oil, soybean oil, castor oil, tallow, lard, etc.) The fatty acids can also be synthetically prepared. Soaps are described in more detail in U.S. Patent No. 4,557,853.

Amphoteric and zwitterionic surfactants are also useful herein. Examples of amphoteric and zwitterionic surfactants which can be used in the compositions of the present invention are those which are broadly described as derivatives of aliphatic secondary and tertiary amines in which the aliphatic radical can be straight or branched chain and wherein one of the aliphatic substituents contains from about 8 to about 22 carbon atoms (preferably $C_8 - C_{18}$) and one contains an anionic water solubilizing group, e.g., carboxy, sulfonate, sulfate, phosphate, or phosphonate. Examples are alkyl imino acetates, and iminodialkanoates and aminoalkanoates of the formulas $RN[(CH_2)_m CO_2M]_2$ and $RNH(CH_2)_m CO_2M$ wherein m is from 1 to 4, R is a C_8 - C_{22} alkyl or alkenyl, and M is H, alkali metal, alkaline earth metal ammonium, or alkanolammonium. Also included are imidazolinium and ammonium derivatives. Specific examples of suitable amphoteric surfactants include sodium 3-dodecyl-aminopropionate, sodium 3-dodecylaminopropane sulfonate, N-alkyltaurines such as the one prepared by reacting dodecylamine with sodium isethionate according to the teaching of U.S. Patent 2,658,072; N-higher alkyl aspartic acids such as those produced according to the teaching of U.S. Patent 2,438,091; and the products sold under the trade name "Miranol" and described in U.S. Patent 2,528,378. Other examples of useful amphoteric surfactants include phosphates, such as coamidopropyl PG-dimonium chloride phosphate (commercially available as Monaquat PTC, from Mona Corp.).

Other amphoteric or zwitterionic surfactants useful herein include betaines. Examples of betaines include the higher alkyl betaines, such as coco dimethyl carboxymethyl betaine, lauryl dimethyl carboxymethyl betaine, lauryl dimethyl alphacarboxyethyl betaine, cetyl dimethyl

carboxymethyl betaine, cetyl dimethyl betaine (available as Lonzaine 16SP from Lonza Corp.), lauryl bis-(2-hydroxyethyl) carboxymethyl betaine, stearyl bis-(2-hydroxypropyl) carboxymethyl betaine, oleyl dimethyl gamma-carboxypropyl betaine, lauryl bis-(2-hydroxypropyl)alpha-carboxyethyl betaine, coco dimethyl sulfopropyl betaine, stearyl dimethyl sulfopropyl betaine, lauryl dimethyl sulfoethyl betaine, lauryl bis-(2-hydroxyethyl) sulfopropyl betaine, and amidobetaines and amidosulfobetaines (wherein the $RCONH(CH_2)_3$ radical is attached to the nitrogen atom of the betaine), oleyl betaine (available as amphoteric Velvetex OLB-50 from Henkel), and cocamidopropyl betaine (available as Velvetex BK-35 and BA-35 from Henkel).

Other useful amphoteric and zwitterionic surfactants include the sultaines and hydroxysultaines such as cocamidopropyl hydroxysultaine (available as Mirataine CBS from Rhone-Poulenc), and the alkanoyl sarcosinates corresponding to the formula $RCON(CH_3)CH_2CH_2CO_2M$ wherein R is alkyl or alkenyl of about 10 to about 20 carbon atoms, and M is a water-soluble cation such as ammonium, sodium, potassium and trialkanolamine (e.g., triethanolamine), a preferred example of which is sodium lauroyl sarcosinate.

3. Water

The preferred oil-in-water emulsion contains from about 25% to about 98%, preferably from about 65% to about 95%, more preferably from about 70% to about 90% water by weight of the topical carrier.

The hydrophobic phase is dispersed in the continuous aqueous phase. The hydrophobic phase may contain water insoluble or partially soluble materials such as are known in the art, including but not limited to the silicones described herein in reference to silicone-in-water emulsions, and other oils and lipids such as described above in reference to emulsions.

The topical compositions of the subject invention, including but not limited to lotions and creams, may contain a dermatologically acceptable emollient. Such compositions preferably contain from about 1% to about 50% of the emollient. As used herein, "emollient" refers to a material useful for the prevention or relief of dryness, as well as for the protection of the skin. A wide variety of suitable emollients are known and may be used herein. Sagarin, Cosmetics, Science and Technology, 2nd Edition, Vol. 1, pp. 32-43 (1972) contains numerous examples of materials suitable as an emollient. A preferred emollient is glycerin. Glycerin is preferably used

in an amount of from or about 0.001 to or about 30%, more preferably from or about 0.01 to or about 20%, still more preferably from or about 0.1 to or about 10%, e.g., 5%.

Lotions and creams according to the present invention generally contain a solution carrier system and one or more emollients. Lotions and creams typically contain from about 1% to about 50%, preferably from about 1% to about 20%, of emollient; from about 50% to about 90%, preferably from about 60% to about 80%, water; and the pentapeptide and/or pentapeptide derivative and the additional skin care active (or actives) in the above described amounts. Creams are generally thicker than lotions due to higher levels of emollients or higher levels of thickeners.

Ointments of the present invention may contain a simple carrier base of animal or vegetable oils or semi-solid hydrocarbons (oleaginous); absorption ointment bases which absorb water to form emulsions; or water soluble carriers, e.g., a water soluble solution carrier. Ointments may further contain a thickening agent, such as described in Sagarin, Cosmetics, Science and Technology, 2nd Edition, Vol. 1, pp. 72-73 (1972), and/or an emollient. For example, an ointment may contain from about 2% to about 10% of an emollient; from about 0.1% to about 2% of a thickening agent; and the pentapeptide and/or pentapeptide derivative and the additional skin care active (or actives) in the above described amounts.

Compositions of this invention useful for cleansing ("cleansers") can be formulated with a suitable carrier, e.g., as described above, and preferably comprise from about 1% to about 90%, more preferably from about 5% to about 10%, of a dermatologically acceptable surfactant. The surfactant is suitably selected from anionic, nonionic, zwitterionic, amphoteric and ampholytic surfactants, as well as mixtures of these surfactants. Such surfactants are well known to those skilled in the detergency art. Nonlimiting examples of possible surfactants include isoceteth-20, sodium methyl cocoyl taurate, sodium methyl oleoyl taurate, and sodium lauryl sulfate. See U.S. Patent No. 4,800,197, to Kowcz et al., issued January 24, 1989, for exemplary surfactants useful herein. Examples of a broad variety of additional surfactants useful herein are described in McCutcheon's Detergents and Emulsifiers, North American Edition (1986), published by Allured Publishing Corporation. The cleansing compositions can optionally contain, at their art-established levels, other materials which are conventionally used in cleansing compositions.

The physical form of the cleansing compositions is not critical. The compositions can be, for example, formulated as toilet bars, liquids, shampoos, bath gels, hair conditioners, hair tonics, pastes, or mousses. Rinse-off cleansing compositions, such as shampoos, require a delivery system adequate to deposit sufficient levels of actives on the skin and scalp. A preferred delivery

system involves the use of insoluble complexes. For a more complete disclosure of such delivery systems, see U.S. Patent 4,835,148, Barford et al., issued May 30, 1989.

As used herein, the term "foundation" refers to a liquid, semi-liquid, semi-solid, or solid skin cosmetic which includes, but is not limited to lotions, creams, gels, pastes, cakes, and the like. Typically the foundation is used over a large area of the skin, such as over the face, to provide a particular look. Foundations are typically used to provide an adherent base for color cosmetics such as rouge, blusher, powder and the like, and tend to hide skin imperfections and impart a smooth, even appearance to the skin. Foundations of the present invention include a dermatologically acceptable carrier and may include conventional ingredients such as oils, colorants, pigments, emollients, fragrances, waxes, stabilizers, and the like. Exemplary carriers and such other ingredients which are suitable for use herein are described, for example, in PCT Application, WO 96/33689, to Canter, et al., published on October 31, 1996 and U.K. Patent, GB 2274585, issued on August 3, 1994.

4. Additional Optional Ingredients

The compositions of the present invention may contain a variety of other ingredients that are conventionally used in given product types provided that they do not unacceptably alter the benefits of the invention. These ingredients should be included in a safe and effective amount for a personal care composition for application to skin.

The *CTFA Cosmetic Ingredient Handbook*, Second Edition (1992) describes a wide variety of nonlimiting cosmetic and pharmaceutical ingredients commonly used in the skin care industry, which are suitable for use in the compositions of the present invention. Examples of these ingredient classes include: abrasives, absorbents, aesthetic components such as fragrances, pigments, colorings/colorants, essential oils, skin sensates, astringents, etc. (e.g., clove oil, menthol, camphor, eucalyptus oil, eugenol, menthyl lactate, witch hazel distillate), anti-acne agents, anti-caking agents, antifoaming agents, antimicrobial agents (e.g., iodopropyl butylcarbamate), antioxidants, binders, biological additives, buffering agents, bulking agents, chelating agents, chemical additives, colorants, cosmetic astringents, cosmetic biocides, denaturants, drug astringents, external analgesics, fatty alcohols and fatty acids, film formers or materials, e.g., polymers, for aiding the film-forming properties and substantivity of the composition (e.g., copolymer of eicosene and vinyl pyrrolidone), opacifying agents, pH adjusters, propellants, reducing agents, sequestrants, skin bleaching and lightening agents, skin-conditioning agents, skin soothing and/or healing agents and derivatives, skin treating agents, thickeners, and vitamins and derivatives thereof. Additional non-limiting examples of additional

suitable skin treatment actives are included in U.S. 2003/0082219 in Section I (i.e. hexamidine, zinc oxide, and niacinamide); U.S. 5,665,339 at Section D (i.e. coolants, skin conditioning agents, sunscreens and pigments, and medicaments); and US 2005/0019356 (i.e. desquamation actives, anti-acne actives, chelators, flavonoids, and antimicrobial and antifungal actives).

5 Examples of suitable emulsifiers and surfactants can be found in, for example, U.S. Patent 3,755,560, U.S. Patent 4,421,769, and McCutcheon's Detergents and Emulsifiers, North American Edition, pages 317-324 (1986). It should be noted, however, that many materials may provide more than one benefit, or operate via more than one mode of action. Therefore, classifications herein are made for the sake of convenience and are not intended to limit the
10 active to that particular application or applications listed. Useful optional ingredients include:

a. Anti-Wrinkle Actives and/or Anti-Atrophy Actives

In another embodiment the composition comprises one or more anti-wrinkle actives or anti-atrophy actives. Exemplary anti-wrinkle/anti-atrophy actives suitable for use in the compositions of the present invention include hydroxy acids (e.g., salicylic acid, glycolic acid),
15 keto acids (e.g., pyruvic acid), ascorbic acid (vitamin C), phytic acid, lysophosphatidic acid, flavonoids (e.g., isoflavones, flavones, etc.), stilbenes, cinnamates, resveratrol, kinetin, zeatin, dimethylaminoethanol, peptides from natural sources (e.g., soy peptides), salts of sugar acids (e.g., Mn gluconate), and retinoids which enhance the keratinous tissue appearance benefits of the present invention, especially in regulating keratinous tissue condition, e.g., skin condition, and
20 other vitamin B compounds (e.g., thiamine (vitamin B1), pantothenic acid (vitamin B5), carnitine (vitamin Bt), riboflavin (vitamin B2), and their derivatives and salts (e.g., HCl salts or calcium salts)).

b. Anti-Oxidants and/or Racial Scavengers

In another embodiment the composition comprises an anti-oxidant/radical scavenger. The
25 anti-oxidant/radical scavenger is especially useful for providing protection against UV radiation that can cause increased scaling or texture changes in the stratum corneum and against other environmental agents, which can cause skin damage. The anti-oxidant/radical scavenger may be from about 0.01% to about 10%, or from about 0.1% to about 5%, of the composition.

Anti-oxidants/radical scavengers such as ascorbic acid (vitamin C) and its salts, ascorbyl
30 esters of fatty acids, ascorbic acid derivatives (e.g., magnesium ascorbyl phosphate), tocopherol (vitamin E), tocopherol sorbate, tocopherol acetate, other esters of tocopherol, butylated hydroxy benzoic acids and their salts, 6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid (commercially available under the tradename Trolox^R), amines (e.g., N,N-diethylhydroxylamine,

amino-guanidine), nordihydroguaiaretic acid, bioflavonoids, amino acidssilymarin, tea extracts, and grape skin/seed extracts may be used. Preferred anti-oxidants/radical scavengers are selected from esters of tocopherol, more preferably tocopherol acetate.

c. Additional Anti-Inflammatory Agents

5 In another embodiment the composition comprises anti-inflammatory at from about 0.01% to about 10%, more preferably from about 0.5% to about 5%, of the composition. The anti-inflammatory agent enhances the skin appearance benefits of the present invention, e.g., such agents contribute to a more uniform and acceptable skin tone or color. The exact amount of anti-inflammatory agent to be used in the compositions will depend on the particular anti-inflammatory agent utilized since such agents vary widely in potency.

10 Steroidal anti-inflammatory agents, include but are not limited to, corticosteroids such as hydrocortisone. A second class of anti-inflammatory agents, which is useful in the compositions, includes the nonsteroidal anti-inflammatory agents. The varieties of compounds encompassed by this group are well known to those skilled in the art. Specific non-steroidal anti-inflammatory agents useful in the composition invention include, but are not limited to, salicylates, flufenamic acid, etofenamate, aspirin, and mixtures thereof.

15 Additional anti-inflammatory agents useful herein include allantoin and compounds of the Licorice (the plant genus/species *Glycyrrhiza glabra*) family, including glycyrrhetic acid, glycyrrhizic acid, and derivatives thereof (e.g., esters).

20 d. Anti-Cellulite Agents

In another embodiment the composition comprises an anti-cellulite agent. Suitable agents may include, but are not limited to, xanthine compounds (e.g., caffeine, theophylline, theobromine, and aminophylline).

e. Tanning Actives

25 In another embodiment the composition comprises a tanning active. When present, it is preferable that the compositions comprise from about 0.1% to about 20%, more preferably from about 2% to about 7%, and even more preferably from about 3% to about 6%, by weight of the composition, of a tanning active. A preferred tanning active is dihydroxyacetone.

f. Skin Lightening Agents

30 The compositions of the present invention may comprise a skin lightening agent from about 0.1% to about 10%, more preferably from about 0.2% to about 5%, also preferably from about 0.5% to about 2%, by weight of the composition, of a skin lightening agent. Suitable skin lightening agents include those known in the art, including kojic acid, arbutin, tranexamic acid,

ascorbic acid and derivatives thereof (e.g., magnesium ascorbyl phosphate or sodium ascorbyl phosphate, ascorbyl glucoside, and the like). Other skin lightening materials suitable for use herein include Acitwhite® (Cognis), Emblica® (Rona), Azeloglicina (Sinerga) and extracts (e.g. mulberry extract).

5 g. Sunscreen Actives

The compositions of the subject invention may optionally contain a sunscreen active at from about 1% to about 20%, more typically from about 2% to about 10% by weight of the composition. As used herein, "sunscreen active" includes both sunscreen agents and physical sunblocks. Suitable sunscreen actives may be organic or inorganic.

10 A wide variety of conventional sunscreen actives are suitable for use herein. Sagarin, et al., at Chapter VIII, pages 189 et seq., of *Cosmetics Science and Technology* (1972), discloses numerous suitable actives. Particularly suitable sunscreen agents are 2-ethylhexyl-p-methoxycinnamate (commercially available as PARSOL MCX), 4,4'-t-butyl methoxydibenzoyl-methane (commercially available as PARSOL 1789), 2-hydroxy-4-methoxybenzophenone, 15 octyldimethyl-p-aminobenzoic acid, digalloyltriolate, 2,2-dihydroxy-4-methoxybenzophenone, ethyl-4-(bis(hydroxy-propyl))aminobenzoate, 2-ethylhexyl-2-cyano-3,3-diphenylacrylate, 2-ethylhexyl-salicylate, glyceryl-p-aminobenzoate, 3,3,5-tri-methylcyclohexylsalicylate, methylantranilate, p-dimethyl-aminobenzoic acid or aminobenzoate, 2-ethylhexyl-p-dimethyl-amino-benzoate, 2-phenylbenzimidazole-5-sulfonic acid, 2-(p-dimethylaminophenyl)-5- 20 sulfonicbenzoxazoic acid, octocrylene, zinc oxide, titanium dioxide, and mixtures thereof.

 h. Conditioning Agents

The compositions of the present invention may comprise a conditioning agent selected from the group consisting of humectants, moisturizers, skin conditioners and mixtures thereof, each can be present at a level of from about 0.01% to about 40%, more preferably from about 25 0.1% to about 30%, and even more preferably from about 0.5% to about 15% by weight of the composition. These materials include, but are not limited to, guanidine; urea; glycolic acid and glycolate salts (e.g. ammonium and quaternary alkyl ammonium); lactic acid and lactate salts (e.g., ammonium and quaternary alkyl ammonium); aloe vera in any of its variety of forms (e.g., aloe vera gel); polyhydroxy compounds such as sorbitol, mannitol, glycerol, hexanetriol, 30 butanetriol, propylene glycol, butylene glycol, hexylene glycol and the like; polyethylene glycols; sugars (e.g., melibiose) and starches; sugar and starch derivatives (e.g., alkoxyated glucose, fructose, sucrose, etc.); hyaluronic acid; lactamide monoethanolamine; acetamide monoethanolamine; sucrose polyester; petrolatum; and mixtures thereof.

Suitable moisturizers, also referred to in the present invention as humectants, include urea, guanidine, glycolic acid and glycolate salts (e.g. ammonium and quaternary alkyl ammonium), lactic acid and lactate salts (e.g. ammonium and quaternary alkyl ammonium), aloe vera in any of its variety of forms (e.g. aloe vera gel), polyhydroxy alcohols (such as sorbitol, glycerol, hexanetriol, propylene glycol, hexylene glycol and the like), polyethylene glycol, sugars and starches, sugar and starch derivatives (e.g. alkoxyated glucose), hyaluronic acid, lactamide monoethanolamine, acetamide monoethanolamine, and mixtures thereof.

i. Thickening Agents (including thickeners and gelling agents)

The compositions of the present invention can comprise one or more thickening agents, preferably from about 0.05% to about 10%, more preferably from about 0.1% to about 5%, and even more preferably from about 0.25% to about 4%, by weight of the composition. Nonlimiting classes of thickening agents include those selected from the group consisting of: Carboxylic Acid Polymers (crosslinked compounds containing one or more monomers derived from acrylic acid, substituted acrylic acids, and salts and esters of these acrylic acids and the substituted acrylic acids, wherein the crosslinking agent contains two or more carbon-carbon double bonds and is derived from a polyhydric alcohol); Crosslinked Polyacrylate Polymers (including both cationic and nonionic polymers, such as described in U. S. Patent No. 5,100,660; 4,849,484; 4,835,206; 4,628,078; 4,599,379, and EP 228,868); Polymeric sulfonic acid (such as copolymers of acryloyldimethyltaurate and vinylpyrrolidone) and hydrophobically modified polymeric sulfonic acid (such as crosspolymers of acryloyldimethyltaurate and beheneth-25 methacrylate); Polyacrylamide Polymers (such as nonionic polyacrylamide polymers including substituted branched or unbranched polymers such as polyacrylamide and isoparaffin and laureth-7 and multi-block copolymers of acrylamides and substituted acrylamides with acrylic acids and substituted acrylic acids); Polysaccharides (nonlimiting examples of polysaccharide gelling agents include those selected from the group consisting of cellulose, carboxymethyl hydroxyethylcellulose, cellulose acetate propionate carboxylate, hydroxyethylcellulose, hydroxyethyl ethylcellulose, hydroxypropylcellulose, hydroxypropyl methylcellulose, methyl hydroxyethylcellulose, microcrystalline cellulose, sodium cellulose sulfate, and mixtures thereof); Gums (i.e. gum agents such as acacia, agar, algin, alginic acid, ammonium alginate, amylopectin, calcium alginate, calcium carrageenan, carnitine, carrageenan, dextrin, gelatin, gellan gum, guar gum, guar hydroxypropyltrimonium chloride, hectorite, hyaluroinic acid, hydrated silica, hydroxypropyl chitosan, hydroxypropyl guar, karaya gum, kelp, locust bean gum, natto gum,

potassium alginate, potassium carrageenan, propylene glycol alginate, sclerotium gum, sodium carboxymethyl dextran, sodium carrageenan, tragacanth gum, xanthan gum, and mixtures thereof); and crystalline, hydroxyl-containing fatty acids, fatty esters or fatty waxes (such as microfibrinous bacterial cellulose structurants as disclosed in U.S. Patent Nos. 6,967,027 to Heux
5 *et al.*; 5,207,826 to Westland *et al.*; 4,487,634 to Turbak *et al.*; 4,373,702 to Turbak *et al.* and 4,863,565 to Johnson *et al.*, U.S. Pat. Publ. No. 2007/0027108 to Yang *et al.*)

j. Water-Soluble Vitamins

The compositions of the present invention may contain a safe and effective amount of one or more water soluble vitamins. Examples of water soluble vitamins include, but are not limited
10 to, water-soluble versions of vitamin B, vitamin B derivatives, vitamin C, vitamin C derivatives, vitamin K, vitamin K derivatives, vitamin D, vitamin D derivatives, vitamin E, vitamin E derivatives, and mixtures thereof. The vitamin compounds may be included as the substantially pure material, or as an extract obtained by suitable physical and/or chemical isolation from natural (e.g., plant) sources. When vitamin compounds are present in the compositions of the
15 instant invention, the compositions preferably contain from about 0.0001% to about 50%, more preferably from about 0.001% to about 10%, still more preferably from about 0.01% to about 5%, and still more preferably from about 0.1% to about 5%, by weight of the composition, of the vitamin compound.

k. Particulate Material

The compositions of the present invention may contain one or more particulate materials. Nonlimiting examples of particulate materials useful in the present invention include colored and uncolored pigments, interference pigments, inorganic powders, organic powders, composite
20 powders, optical brightener particles, and combinations thereof. These particulates can be platelet shaped, spherical, elongated or needle-shaped, or irregularly shaped, surface coated or uncoated, porous or non-porous, charged or uncharged, and can be added to the current
25 compositions as a powder or as a pre-dispersion. These particulate materials may provide a wide range of functions, including but not limited to modifying skin feel, masking the appearance of certain skin characteristics such as exfoliating benefits, blotchy areas, age spots, freckles, fine lines, wrinkles, and pores, absorbing excess skin sebum/oils, reducing skin shine, improving
30 application properties of the composition, masking the color of other components of the composition, filling in skin pores, lines and wrinkles, and reducing migration of liquid materials on the skin. Preferably, particulate materials are present in the composition in levels of from about 0.01% to about 20%, more preferably from about 0.05% to about 10%, still more

preferably from about 0.1% to about 5%, by weight of the composition. There are no specific limitations as to the pigment, colorant or filler powders used in the composition. Examples of suitable particulates for use herein are described in U.S. Patent Publ. 2005/0019356A1.

5. Composition Forms

5 The topical compositions of the subject invention, including but not limited to lotions, milks, creams and ointments, may comprise a dermatologically acceptable emollient. Such compositions preferably contain from about 2% to about 50% of the emollient. As used herein, "emollient" refers to a material useful for the prevention or relief of dryness, as well as for the protection of the skin. A wide variety of suitable emollients is known and may be used herein.

10 Sagarin, *Cosmetics, Science and Technology*, 2nd Ed, v1, pp. 32-43 (1972), contains numerous examples of materials suitable as an emollient. Non-limiting examples of preferred emollients include glycerin and fatty acid esters. The emollient can be used in an amount of from about 0.001 to about 20%, or from about 0.01 to about 15%, or from about 0.1 to about 10% by weight of the composition.

15 6. Optional Lathering Surfactants

 Where the personal care composition is a wash or cleansing composition, the carrier can comprise one or more lathering surfactants and the carrier can be at a level of from about 60% to about 99.99%. A lathering surfactant defined herein as surfactant, which when combined with water and mechanically agitated generates a foam or lather. Preferably, these surfactants or

20 combinations of surfactants should be mild, which means that these surfactants provide sufficient cleansing or detergent benefits but do not overly dry the skin or hair while still lathering. Those of skill in the art should understand that the lathering surfactant is in addition to the surfactant derived from a predominantly unsaturated triglyceride described above.

 A wide variety of lathering surfactants are useful herein and include those selected from

25 the group consisting of anionic lathering surfactants, nonionic lather surfactants, amphoteric lathering surfactants, and mixtures thereof. Generally, the lathering surfactants are fairly water soluble. When used in the composition, at least about 4% of the lathering surfactants have a HLB value greater than about ten. Examples of such surfactants are found in and U.S. Pat. 5,624,666. Cationic surfactants can also be used as optional components, provided they do not negatively

30 impact the overall lathering characteristics of the required lathering surfactants

 Concentrations of these surfactant are from about 10% to about 20%, alternatively from about 6% to about 25%, and alternatively from about 4% to about 30% by weight of the composition. To avoid skin irritation issues, the compositions should have a ratio by weight of

the composition of anionic surfactant to amphoteric and/or zwitterionic surfactant is from about 1.1: 1 to about 1:1.5, alternatively from about 1.25:1 to about 1:2, and alternatively from about 1.5:1 to about 1:3.

Anionic lathering surfactants useful in the compositions of the present invention are disclosed in McCutcheon's, Detergents and Emulsifiers, North American edition (1986),
5 published by allured Publishing Corporation; McCutcheon's, Functional Materials, North American Edition (1992); and U.S. Pat. No. 3,929,678. A wide variety of anionic lathering surfactants are useful herein. Non-limiting examples of anionic lathering surfactants include those selected from the group consisting of sarcosinates, sulfates, sulfonates, isethionates,
10 taurates, phosphates, lactylates, glutamates, and mixtures thereof.

Other anionic materials useful herein are soaps (i.e., alkali metal salts, e.g., sodium or potassium salts) of fatty acids, typically having from about 8 to about 24 carbon atoms, preferably from about 10 to about 20 carbon atoms, monoalkyl, dialkyl, and trialkylphosphate salts, alkanoyl sarcosinates corresponding to the formula $RCON(CH_3)CH_2CH_2CO_2M$ wherein R is alkyl or
15 alkenyl of about 10 to about 20 carbon atoms, and M is a water-soluble cation such as ammonium, sodium, potassium and alkanolamine (e.g., triethanolamine). Also useful are taurates which are based on taurine, which is also known as 2-aminoethanesulfonic acid, and glutamates, especially those having carbon chains between C_8 and C_{16} .

Non-limiting examples of preferred anionic lathering surfactants useful herein include
20 those selected from the group consisting of sodium lauryl sulfate, ammonium lauryl sulfate, ammonium laureth sulfate, sodium laureth sulfate, sodium trideceth sulfate, ammonium cetyl sulfate, sodium cetyl sulfate, ammonium cocoyl isethionate, sodium lauroyl isethionate, sodium lauroyl lactylate, triethanolamine lauroyl lactylate, sodium caproyl lactylate, sodium lauroyl sarcosinate, sodium myristoyl sarcosinate, sodium cocoyl sarcosinate, sodium lauroyl methyl
25 taurate, sodium cocoyl methyl taurate, sodium lauroyl glutamate, sodium myristoyl glutamate, and sodium cocoyl glutamate and mixtures thereof.

Suitable amphoteric or zwitterionic deterative surfactants for use in the compositions herein include those which are known for use in hair care or other personal care cleansing. Concentration of such amphoteric deterative surfactants is from about 1% to about 10%,
30 alternatively from about 0.5 % to about 20% by weight of the composition. Non-limiting examples of suitable zwitterionic or amphoteric surfactants are described in U.S. Patents 5,104,646 and U.S. Patent 5,106,609.

Nonionic lathering surfactants for use in the compositions of the present invention are disclosed in McCutcheon's, Detergents and Emulsifiers, North American edition (1986), published by Allured Publishing Corporation; and McCutcheon's, Functional Materials, North American Edition (1992); both of which are incorporated by reference herein in their entirety.

5 Nonionic lathering surfactants useful herein include those selected from the group consisting of alkyl glucosides, alkyl polyglucosides, polyhydroxy fatty acid amides, alkoxyated fatty acid esters, lathering sucrose esters, amine oxides, and mixtures thereof.

Other examples of nonionic surfactants include amine oxides. Amine oxides correspond to the general formula $R^1R^2R^3NO$, wherein R^1 contains an alkyl, alkenyl or monohydroxy alkyl radical of from about 8 to about 18 carbon atoms, from 0 to about 10 ethylene oxide moieties, and from 0 to about 1 glyceryl moiety, and R^2 and R^3 contain from about 1 to about 3 carbon atoms and from 0 to about 1 hydroxy group, e.g., methyl, ethyl, propyl, hydroxyethyl, or hydroxypropyl radicals. Examples of amine oxides suitable for use in this invention include dimethyl-dodecylamine oxide, oleyldi(2-hydroxyethyl) amine oxide, dimethyloctylamine oxide, dimethyl-decylamine oxide, dimethyl-tetradecylamine oxide, 3,6,9-trioxaheptadecyldiethylamine oxide, di(2-hydroxyethyl)-tetradecylamine oxide, 2-dodecoxyethyldimethylamine oxide, 3-dodecoxy-2-hydroxypropyldi(3-hydroxypropyl)amine oxide, dimethylhexadecylamine oxide.

Preferred lathering surfactants for use herein are the following, wherein the anionic lathering surfactant is selected from the group consisting of ammonium lauroyl sarcosinate, sodium trideceth sulfate, sodium lauroyl sarcosinate, sodium myristoyl sarcosinate, ammonium laureth sulfate, sodium laureth sulfate, ammonium lauryl sulfate, sodium lauryl sulfate, ammonium cocoyl isethionate, sodium cocoyl isethionate, sodium lauroyl isethionate, sodium cetyl sulfate, sodium lauroyl lactylate, triethanolamine lauroyl lactylate, and mixtures thereof; wherein the nonionic lathering surfactant is selected from the group consisting of lauramine oxide, cocoamine oxide, decyl polyglucose, lauryl polyglucose, sucrose cocoate, C_{12-14} glucosamides, sucrose laurate, and mixtures thereof; and wherein the amphoteric lathering surfactant is selected from the group consisting of disodium lauroamphodiacetate, sodium lauroamphoacetate, cetyl dimethyl betaine, cocoamidopropyl betaine, cocoamidopropyl hydroxy sultaine, and mixtures thereof.

30 7. Methods of Use

The personal care composition can be in any suitable personal care composition which comes in contact with skin or hair. Non-limiting examples of suitable personal care compositions include cosmetics, moisturizers, lotions, oils, , shave oils, after shaves, pre-shave

treatments such as lotions, and so forth. The present composition can be used in combination with various hair removal applications (prior to, concurrently with, and/or after), including but not limited to shaving (wet or dry shaving, via electric razors, via powered or manual razors which can be reusable or disposable, and combinations thereof), epilation, electrolysis, wax or depilatories as well as energy delivery devices to help regulate hair growth. Nonlimiting
5 examples of energy deliver devices include: light, heat, sound (including ultrasonic waves and radio frequency), electrical energy, magnetic energy, electromagnetic energy (including radiofrequency waves and microwaves), and combinations thereof. The light energy may be delivered by devices including, but not limited to, lasers, diode lasers, diode laser bars, diode
10 laser arrays, flash lamps, intense pulsed light (IPL) sources, and combinations thereof. *See e.g.* US2006/0235370A1.

In one preferred embodiment, the personal care composition is used as a post shave moisturizers and/or balms. The present invention also relates to a method of reducing irritation by applying a personal care composition of the present invention onto skin to form a treated
15 surface. Said treated surface can be selected from the group consisting of the facial area, neck area, underarms, chest, back, bikini or groin area, the legs, or combinations thereof. Where the composition is used in a shaving regimen, the method of use can further comprise a step of shaving a portion of skin which can be performed before or after applying the composition to skin. In one preferred embodiment, the personal care composition is used in a post-shave
20 application such as a leave-on gels, balm, or moisturizer to be applied to skin (e.g facial or body) immediately after or shortly after shaving, during shaving, during or after the shower, and so forth. Those of skill in the art will understand that the hair removal step can be shaving or any of the hair removal technologies described in the previous paragraph. The composition can be left on for a brief or extended amount of time (i.e. not washed off), for example from 1 minute to 24
25 hours, or from about 5 minutes to about 3 hour, or from about 10 minutes to about 20 minutes. In one embodiment, the method further comprises a step not rinsing off said composition from the treated surface. In one embodiment, the method further comprises a step of shaving said portion of skin before applying the composition or after said step of applying said personal care composition.

30 8. Examples and FIGs. 1 and 2

Examples shown in FIG. 1 and FIG 2 are: Moisturizer/Balms. These examples are non-limiting and other product forms, such as those described above are also within the scope of the invention. The anti-irritation agent can be added to these examples in any phase at varying

levels, for example, at a level of 0.5 % to about 3 %, or any level as disclosed above. The anti-irritation agent is preferably a zinc pyrithione, a zinc salt, or a combination thereof. These examples are made as follows:

Phase A materials are combined and heated in a container. Phase B materials are combined and heated in a separate container. Phase B is added to Phase A under high shear. The mixture of Phases A and B is cooled and the contents of Phase C are added with mixing. Phase D materials are blended in a separate container and added to the mixture of Phases A, B, and C. The final mixture is stirred until well blended. Qs means quantity sufficient to reach 100%.

All percentages and ratios used herein are by weight of the total composition and all measurements made are at 25°C, unless otherwise designated.

The compositions of the present invention can comprise, consist essentially of, or consist of, the essential components as well as optional ingredients described herein. As used herein, “consisting essentially of” means that the composition or component may include additional ingredients, but only if the additional ingredients do not materially alter the basic and novel characteristics of the claimed compositions or methods.

“Dermatologically acceptable,” as used herein, means that the compositions or components described are suitable for use in contact with human keratinous tissue without undue toxicity, incompatibility, instability, allergic response, and the like.

All percentages disclosed herein, unless otherwise stated, are by weight of the named material itself that is found in the compositions, thereby excluding for example the weight associated with carriers, impurities and by-products found in the raw material.

It should be understood that every maximum numerical limitation given throughout this specification includes every lower numerical limitation, as if such lower numerical limitations were expressly written herein. Every minimum numerical limitation given throughout this specification includes every higher numerical limitation, as if such higher numerical limitations were expressly written herein. Every numerical range given throughout this specification includes every narrower numerical range that falls within such broader numerical range, as if such narrower numerical ranges were all expressly written herein.

All parts, ratios, and percentages herein, in the Specification, Examples, and Claims, are by weight and all numerical limits are used with the normal degree of accuracy afforded by the art, unless otherwise specified. The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a

functionally equivalent range surrounding that value. For example, a dimension disclosed as “40 mm” is intended to mean “about 40 mm”.

All documents cited in the DETAILED DESCRIPTION OF THE INVENTION are, in the relevant part, incorporated herein by reference; the citation of any document is not to be
5 construed as an admission that it is prior art with respect to the present invention. To the extent that any meaning or definition of a term or in this written document conflicts with any meaning or definition in a document incorporated by reference, the meaning or definition assigned to the term in this written document shall govern.

Except as otherwise noted, the articles "a," "an," and "the" mean "one or more."

10 While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

CLAIMS

What is claimed is:

- 1) A personal care composition comprising:
 - a) from 0.01% to 5%, preferably from 0.25% to 2.5% of an anti-irritation agent comprising pyrithione, a polyvalent metal salt of pyrithione, or a mixture thereof;
 - b) from 50% to 99.99% of a carrier.
- 2) The personal care composition of claim 1, wherein said anti-irritation agent comprises zinc pyrithione.
- 3) The personal care composition of claim 2, wherein said zinc pyrithione is in the form of a platelet having a median particle diameter of 0.5 microns to 10, a mean particle diameter of 0.5 to 10 microns, and a thickness of 0.6 to 15 microns.
- 4) The personal care composition of claim 2 or 3, wherein the zinc pyrithione is in platelet particle form having an average size of up to 20 μ m.
- 5) The personal care composition of any preceding claim, further comprising from 0.001% to 10% of a zinc salt.
- 6) The personal care composition of claim 5, wherein said zinc salt comprises zinc oxide.
- 7) The personal care composition of any preceding claim, wherein the carrier is selected from the group consisting of an oil-in-water emulsion and a water-in-oil emulsion, wherein the oil phase comprises silicone.
- 8) The personal care composition of claim 7, wherein said carrier is an oil-in-water emulsion further comprising:
 - a) from 1% to 5%, by weight of the composition, of a structuring agent;
 - b) from 1% to 3% by weight of the composition of at least one hydrophilic surfactant; and
 - c) from 70% to 90% by weight of the composition of water.
- 9) The personal care composition of any preceding claim, wherein the carrier further comprises an emulsifier.

- 10) The personal care composition of any preceding claim, wherein said carrier comprises glycerin and an emollient selected from fatty esters, petroleum derived oils and silicones.
- 11) The personal care composition of any preceding claim, further comprising from 0.001% to about 1% of methyl naphthalenyl ketone.
- 12) The personal care composition of any preceding claim, further comprising: from 0.001% to 8% of a multi-active system for down regulating cytokines, said multi active system comprising Bisabolol and Ginger root; sodium polyethylene glycol 7 olive oil carboxylate.
- 13) The personal care composition of any preceding claim, further comprising a conditioning agent selected from the group consisting of humectants, moisturizers, skin conditioners and mixtures thereof, wherein each can be present at a level of from 0.01% to 40%.
- 14) The personal care composition of Claim 13, wherein said conditioning agent is selected from the group consisting of guanidine; urea; glycolic acid and glycolate salts; lactic acid and lactate salts; aloe vera; polyhydroxy compounds; polyethylene glycols; sugars and starches; sugar and starch derivatives; hyaluronic acid; lactamide monoethanolamine; acetamide monoethanolamine; sucrose polyester; petrolatum; and mixtures thereof.
- 15) A method of use comprising: applying the personal care composition of any preceding claim to a portion of skin to form a treated surface.

	1	2	3	4	5	6	7	8	9	10	11	12
Example												
Phase A												
Water	QS to 100 (-75-85%)	QS to 100 (-75-85%)	QS to 100 (-75-85%)	QS to 100 (-75-85%)	QS to 100 (-75-85%)	QS to 100 (-75-85%)	QS to 100 (-75-85%)	QS to 100 (-75-85%)	QS to 100 (-75-85%)	QS to 100 (-75-85%)	QS to 100 (-75-85%)	QS to 100 (-75-85%)
Glycerin	8.00%	6.00%	6.00%	6.00%	4.00%	5.00%	4.00%	4.00%	2.00%	2.00%	3.00%	2.00%
Sorbitol					2.00%	2.00%			2.00%	2.00%	2.00%	2.00%
Disodium EDTA	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.05%	0.05%	0.05%	0.05%
Phase B												
Cetearyl Alcohol									1.00%	1.00%	1.00%	1.00%
Cetearyl Glucoside, Cetearyl Alcohol (Emulgade PI 68/50)	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%				
Cetearyl Isononanoate (Cetiol SN)	5.00%	5.00%	5.00%	3.50%	3.50%	5.00%	5.00%	5.00%	1.50%	1.50%	1.50%	3.50%
Cetyl Alcohol	0.89%	0.89%	0.89%	0.89%	0.89%	0.89%	0.89%	0.89%				
PEG-100 Stearate (Myrij 59)	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%				
Polymethylsiloxoxane (CF600)	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%			1.00%	1.00%
Sorbitan Stearate	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%				
Stearth-2	0.10%	0.10%							1.80%	1.80%	1.80%	1.80%
Stearth-21	0.10%	0.10%							0.90%	0.90%	0.90%	0.90%
Stearic acid	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%					
Stearyl Alcohol	0.61%	0.61%	0.61%	0.61%	0.61%	0.61%	0.61%	0.61%				
Phase C												
Aluminum Starch Octenylsuccinate (Dry-Flo Pure (28-1850))	4.00%	4.00%	4.00%	4.00%	3.00%	3.00%	3.00%	3.00%				
Ammonium Acryloyldimethyltaurate/VP Copolymer (Aristoflex AVC)	0.75%		0.75%	0.75%	0.75%	0.75%	0.75%		0.75%	2.00%		
Cyclomethicone (Dow Corning 345 fluid)												
Dimethicone (and) Dimethiconol (Dow Corning 1503)	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	0.50%	0.50%	0.50%
FD&C Blue No. 1 (CI 42090)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Glydant 55 (DMDM Hydantoin)	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
Glydant Plus Liquid (DMDM Hydantoin and Isodopropyl Butyl Carbamate)	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%
KTZ Interfine Gold (Mica, Titanium dioxide, and Tin Oxide)	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%			0.10%	
KTZ Interfine Green (Mica and Titanium dioxide)	0.50%	0.50%	0.50%	0.50%	0.25%	0.25%	0.50%	0.50%			0.25%	
Net-DG (Dipotassium Glycyrrhizinate)	0.25%	0.08%	0.25%	0.25%	0.25%	0.25%	0.25%	0.33%	0.08%	0.08%	0.25%	0.25%
Parthenol	0.60%	0.20%	0.60%	0.60%	0.60%	0.60%	0.60%	0.80%	0.20%	0.20%	0.60%	0.60%
Septiplex 400		0.75%						0.75%		0.75%	0.75%	0.75%
White Tea Extract (1% in Propylene Glycol)	0.10%	0.05%	0.10%	0.10%	0.10%	0.10%	0.10%	0.13%	0.05%	0.05%	0.10%	0.10%
Phase D												
Fragrance	0.80%	0.80%	0.80%	0.80%	0.80%	0.80%	0.80%	0.80%	0.40%	0.40%	0.40%	0.40%
Menthol	0.05%	0.09%	0.09%	0.09%	0.05%	0.09%	0.09%	0.05%			0.05%	0.05%
Menthyl Lactate (Frescolat Type ML)	0.15%	0.20%	0.20%	0.20%	0.25%	0.20%	0.20%	0.15%			0.15%	0.15%

FIG. 1

Example	1	2	3	4	5	6	7	8	9	10	11	12
Phase A												
Water	QS to 100 (~75-85%)	QS to 100 (~75-85%)	QS to 100 (~75-85%)	QS to 100 (~75-85%)	QS to 100 (~75-85%)	QS to 100 (~75-85%)	QS to 100 (~75-85%)	QS to 100 (~75-85%)	QS to 100 (~75-85%)	QS to 100 (~75-85%)	QS to 100 (~75-85%)	QS to 100 (~75-85%)
Glycerin	8.00%	6.00%	6.00%	6.00%	4.00%	5.00%	4.00%	4.00%	2.00%	2.00%	3.00%	2.00%
Sorbitol					2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Disodium EDTA	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.05%	0.05%	0.05%	0.05%
Phase B												
Cetearyl Alcohol									1.00%	1.00%	1.00%	1.00%
Cetearyl Glucoside, Cetearyl Alcohol (Emulgade PI 68/50)	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%				
Cetearyl Isononanoate (Cetiol SN)	5.00%	5.00%	5.00%	3.50%	3.50%	5.00%	5.00%	5.00%	1.50%	1.50%	1.50%	3.50%
Cetyl Alcohol	0.89%	0.89%	0.89%	0.89%	0.89%	0.89%	0.89%	0.89%				
PEG-100 Stearate (Myrj 59)	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%				
Polymethylsilsesquioxane (CF600)	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%			1.00%	1.00%
Sorbitan Stearate	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%				
Steareth-2	0.10%	0.10%							1.80%	1.80%	1.80%	1.80%
Steareth-21	0.10%	0.10%							0.90%	0.90%	0.90%	0.90%
Stearic acid	0.10%	0.10%	0.10%		0.10%	0.10%	0.10%					
Stearyl Alcohol	0.61%	0.61%	0.61%	0.61%	0.61%	0.61%	0.61%	0.61%				
Phase C												
Aluminum Starch Octenylsuccinate (Dry-Flo Pure (28-1850))	4.00%	4.00%	4.00%	4.00%	3.00%	3.00%	3.00%	3.00%				
Ammonium Acryloyldimethyltaurate/VP Copolymer (Aristoflex AVC)	0.75%		0.75%	0.75%	0.75%	0.75%	0.75%		0.75%	2.00%		
Cyclomethicone (Dow Corning 345 fluid)												
Dimethicone (and) Dimethiconol (Dow Corning 1503)	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	0.50%	0.50%	0.50%	0.50%
FD&C Blue No. 1 (CI 42090)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Glydant 55 (DMDM Hydantoin)	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
Glydant Plus Liquid (DMDM Hydantoin and Iodopropynyl Butyl Carbamate)	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%	0.32%
KTZ Interfine Gold (Mica, Titanium dioxide, and Tin Oxide)	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%			0.10%	
KTZ Interfine Green (Mica and Titanium dioxide)	0.50%	0.50%	0.50%	0.50%	0.25%	0.25%	0.50%	0.50%			0.25%	
Net-DG (Dipotassium Glycyrrhizinate)	0.25%	0.08%	0.25%	0.25%	0.25%	0.25%	0.25%	0.33%	0.08%	0.08%	0.25%	0.25%
Panthenol	0.60%	0.20%	0.60%	0.60%	0.60%	0.60%	0.60%	0.80%	0.20%	0.20%	0.60%	0.60%
Sepiplus 400		0.75%						0.75%			0.75%	0.75%
White Tea Extract (1% in Propylene Glycol)	0.10%	0.05%	0.10%	0.10%	0.10%	0.10%	0.10%	0.13%	0.05%	0.05%	0.10%	0.10%
Phase D												
Fragrance	0.80%	0.80%	0.80%	0.80%	0.80%	0.80%	0.80%	0.80%	0.40%	0.40%	0.40%	0.40%
Menthol	0.05%	0.09%	0.09%	0.09%	0.05%	0.09%	0.09%	0.05%			0.05%	0.05%
Menthyl Lactate (Frescolat Type ML)	0.15%	0.20%	0.20%	0.20%	0.25%	0.20%	0.20%	0.15%			0.15%	0.15%
Iso E Super	0.05%	0.05%	0.005%	0.005%	0.005%	0.025%	0.05%	0.05%	0.025%	0.025%	0.005%	0.005%

FIG. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/051119

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A61K8/27 A61K8/34 A61K8/35 A61K8/49 A61K8/92
 A61K8/97 A61Q9/00 A61Q19/00 A61K8/02 A61K8/06
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 A61K A61Q
 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 practicable, search terms used)
 EPO-Internal, WPI Data, BIOSIS, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 19 December 2012	Date of mailing of the international search report 07/01/2013
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Tullberg, Erik
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INTERNATIONAL SEARCH REPORT

International application No

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