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(54) Title: PERSONAL CARE COMPOSITIONS

(57) Abstract: In a first aspect, personal care compositions are provided comprising oil-in-water emulsions, the emulsions comprising defined water-soluble emulsification polymers. In a second aspect, a method of manufacture of the personal care compositions according to the first aspect is provided.

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PERSONAL CARE COMPOSITIONS

FIELD OF INVENTION

The present application concerns personal care compositions comprising defined oil-in-water emulsions and methods for manufacturing the personal care compositions.

BACKGROUND OF INVENTION

Emulsions are generally stabilised by appropriate emulsifying surfactants, which, by virtue of their amphiphillic structure, reside at the oil/water interface and thus stabilise the dispersed droplets. These surfactants typically exhibit the disadvantage, however, of penetrating and potentially irritating the skin, eyes and scalp and generally giving poor skin feel. Furthermore, the use of conventional surfactants to manufacture emulsions typically necessitates the application of heat during processing, which can also be disadvantageous, in that it can restrict the ability to include heat-sensitive ingredients and in that it may also limit the types of place in which the manufacturing method may be performed - safety and other concerns, may, for example, prohibit manufacturing the emulsions in certain desired locations.

Another disadvantage of traditional surfactants, including alkoxylated surfactants, is that they may cause materials to re-emulsify after the emulsion breaks – emulsion breakage allows delivery of emulsified materials, but re-emulsification, such as after application of a personal cleansing composition to the skin during washing/showering, may reduce the desired benefit (because emulsified emollients and actives are washed off the skin in this example).

A further disadvantage of conventional surfactants is their inability to satisfactorily emulsify polar oils, such as oils having a high solubility parameter.

US 4,640,709 teaches to manufacture oil-in-water emulsions using water-soluble alkylated polyvinylpyrrolidone emulsifiers. These oil-in-water emulsions represent an intermediate on the road to the encapsulation of water immiscible materials, the encapsulation being achieved by reacting the alkylated PVP with an additional component to create a polycondensate "shell wall" around the water immiscible material. US 4,640,709 relates to the encapsulation of herbicides, insecticides and other agricultural chemicals.

Concentrated emulsions having a high discontinuous phase, wherein the discontinuous phase comprises water or oil, for example, are known and have found application in a number of technologies, such as fuels, cosmetics and foods - an everyday example of these emulsions is mayonnaise (which may typically comprise about 70% vegetable oil in water). These concentrated emulsions have also found application in the cosmetic area because the concentrates can stably contain high concentrations of, for example, emollients, moisturisers and sunscreens, which can then be diluted down using simple cold mixing to obtain the desired end product. Reference may be made to US 4,606,913 and US 5,976,604, which teach concentrated emulsions.

In the light of the above considerations, it would be beneficial to develop oil-in-water emulsion-based personal care compositions that have a reduced capacity to irritate human skin and membranes and provide improved skin feel. In addition, it would be advantageous to develop personal care compositions which are more substantive to the substrate to which they are applied, such as human skin or fabrics, and exhibit a reduced tendency to re-emulsify once broken.

SUMMARY OF INVENTION

According to a first aspect of the invention, a personal care composition is provided comprising an emulsion, the emulsion comprising an aqueous continuous phase, a discontinuous oil phase and emulsifier, wherein the emulsifier comprises a non-alkoxylated water-soluble emulsification polymer having a molecular weight of at least 3000 Daltons, a 0.1%wt aqueous solution of the water-soluble emulsification polymer having a surface tension of 15-60 mN/m (15-60 dynes/cm) when measured at 25°C.

As used herein, the term "personal care" includes cosmetic and personal cleansing applications, such as, but not limited to, skin moisturising applications, skin cleansing applications, make-up applications, deodorant and anti-perspirant applications and fine fragrance applications.

As used herein, the term "non-alkoxylated" in relation to the water-soluble emulsification polymers means polymers comprising no alkoxy groups, that is no –OR groups (where R includes alkyl moieties) in the molecule, neither in the polymer backbone, nor as pendants thereto nor elsewhere.

As used herein, the term "oil-in-water" or "o/w" means that an oil phase is dispersed in an aqueous phase, such that the aqueous phase is the continuous phase and the oil phase the discontinuous phase.

According to a second aspect of the invention, a method of manufacture of personal care compositions comprising the following steps is provided:

(a) Manufacturing a concentrated emulsion comprising at least 50% by weight of the emulsion of discontinuous oil phase, an aqueous continuous phase and emulsifier, wherein the emulsifier comprises a non-alkoxylated water-soluble emulsification polymer having a molecular weight of at least 3000 Daltons, a 0.1%wt aqueous solution of the water-soluble emulsification polymer having a surface tension of 15-60 mN/m (15-60 dynes/cm) when measured at 25°C;

(b) Manufacturing a pre-mix of the all other components of the personal care composition;

(c) Adding the concentrated emulsion to the pre-mix with continual mixing.

(d) Continuing mixing until a personal care composition of uniform consistency is obtained.

DETAILED DESCRIPTION OF INVENTION

All weights, measurements and concentrations herein are measured at 25°C on the composition in its entirety, unless otherwise specified.

Unless otherwise indicated, all percentages of compositions referred to herein are weight percentages of the total composition (i.e. the sum of all components present) and all ratios are weight ratios.

Unless otherwise indicated, all polymer molecular weights are weight average molecular weights.

Unless otherwise indicated, the content of all literature sources referred to within this text are incorporated herein in full by reference.

Except where specific examples of actual measured values are presented, numerical values referred to herein should be considered to be qualified by the word "about".

The oil phase according to the invention may comprise any water immiscible material that is liquid at ambient conditions; any material that is solid at ambient conditions, has a melting temperature of less than 100°C and melts to form a water immiscible liquid; mixtures of such materials.

As used herein in relation to the oil phase, the term "water immiscible" includes materials having a Hildebrand Solubility Parameter of around 5-12 calories/cc (209 – 502 kJ/m^2). The solubility parameter is defined as the sum of all attractive forces radiating out of a molecule. The total Van der Waals force is called the Hildebrand Solubility Parameter and can be calculated using Hildebrand's equation using boiling point and MW data. Methods and a computer program for calculating the Hildebrand Solubility Parameter are disclosed by C.D. Vaughan in J. Cosmet. Chem. 36, 319-333 (September/October 1985).

Materials comprised within the oil phase may have any polarity and may include aliphatic or aromatic hydrocarbons, esters, alcohols, ethers, carbonates, fluorocarbons, silicones, fluorosilicones or derivatives thereof.

Solid materials that may be present in the oil phase include waxes. As used herein, the term "wax" includes natural and synthetic waxes. The class of natural waxes includes animal waxes, such as beeswax, lanolin, shellac wax and Chinese insect wax; vegetable waxes, such as carnauba, candelilla, bayberry and sugar cane; mineral waxes, such as ceresin and ozokerite; petrochemical waxes, such as microcrystalline wax and petrolatum. The class of synthetic waxes includes ethylenic polymers and polyol ether-esters, chlorinated naphthalenes and Fischer-Tropsch waxes. For more details, please refer to see Römpp Chemie Lexikon, Georg Thieme Verlag, Stuttgart, 9th Edition, 1995 under "Wachse".

Advantageously, materials comprised within the oil phase, including the melted waxes, have a viscosity in the range from 0.005 to 30,000cm^2/s (0.5 to 3,000,000 cst), preferably from 0.005 to 20,000cm^2/s (0.5 to 2,000,000 cst), more preferably from 0.005 to 3500cm^2/s (0.5 to 350,000 cst).

The oil phase may comprise from a few percent up to over 90%wt of the personal care composition. Advantageously, the oil phase comprises less than 50%wt of the personal care composition.

The aqueous phase of the emulsions according to the invention comprises water and may also comprise additional water-soluble components, such as alcohols; humectants, including polyhydric alcohols (e.g. glycerine and propylene glycol); active agents such as d-panthenol, vitamin B_3 and its derivatives (such as niacinamide) and botanical extracts; thickeners and preservatives.

The water-soluble emulsification polymers according to the invention have a molecular weight of at least 3000 Daltons, since below this level, the resulting emulsions have poor skin feel. Skin feel improves with increasing molecular weight and it is preferred that the water-soluble emulsification polymers according to the invention have a molecular weight above 7500 Daltons, more preferably above 9000 Daltons and, more preferably still, above 10,000 Daltons.

The molecular weight of the emulsification polymers advantageously does not exceed 130 kiloDaltons; above this point, especially at the concentrations of emulsification polymer that one would typically use and when the internal oil phase is present at levels above 80% by weight of the emulsion, the viscosity of the aqueous phase may reach a level that hinders emulsification.

Advantageously, at least 50%wt, preferably at least 70%wt and more preferably at least 80%wt of the total weight of emulsifier comprised within the present emulsions consists of one or more non-alkoxylated water-soluble emulsification polymers. Highly advantageously, the emulsifier comprised within the present emulsions consists only of one or more non-alkoxylated water-soluble emulsification polymers as herein defined.

Surprisingly, it has been found that any non-alkoxylated, water-soluble polymer fulfilling the defined molecular weight and surface tension criteria may be used to emulsify the emulsions according to the present invention and are capable of mitigating the problems encountered in the prior art. This applies regardless of the chemical nature of the water-soluble polymer, so that polymers of widely differing chemistries may be employed. Non-limiting water-soluble polymers which may be employed according to the invention include: alkylated

polyvinylpyrrolidone, such as buylated polyvinylpyrrolidone commercialised as "Ganex P904" by ISP Corp.; mono alkyl esters of poly(methyl vinyl ether/maleic acid) sodium salt, including mono butyl ester of poly(methyl vinyl maleic acid sodium salt) such as included in the product commercialised as "EZ Sperse" by ISP Corp; isobutylene/ethylmaleimide/hydroxyethyl copolymer, such as included in the product commercialised as "Aquafix FX64" by ISP Corp.; (3-dimethylaminopropyl)-methacrylamide/3-methacryloylamidopropyl-lauryl-dimthyl-ammonium chloride, such as included in the product commercialised as Styleze W20 by ISP Corp.

Advantageously, at least one of the non-alkoxylated, water-soluble polymers according to the invention has film-forming properties. These properties are found in higher molecular weight polymers, especially those having a molecular weight above 10,000 Daltons. The film-forming property may further increase the substantivity of the emulsions on the substrate versus traditional surfactants, including alkoxylated surfactants. Dried-down oil-in-water emulsions comprising traditional surfactants, including alkoxylated surfactants, suffer from the disadvantage that they may re-emulsify when wetted, whereas the present non-alkoxylated, water-soluble polymers are less liable to do that. Without wishing to be bound by theory, it is believed that the substantivity of the present compositions may be further increased if the polymers exhibit film-forming properties, because the film-forming polymer may form a film over the oil phase to retain it on the substrate.

The personal care compositions according to the invention may comprise from 0.001% to 5%, preferably from 0.01% to 2% and more preferably 0.1 to 1% by weight water-soluble emulsification polymer.

The personal care compositions according to the invention may comprise addiitonal components. The precise nature of these other components will depend on the nature of the final product – for example, whether it is a lotions, a shampoo, a make-up, or a perfume composiiton - so that it is not possible to present an exhaustive list here. Non-limiting examples of other components include solvents, including water; thickeners; humectants, such as polyhydric alcohols, including glycerine and propylene glycol; pigments, including organic and inorganic pigments; preservatives; chelating agents, antimicrobials, perfumes. Surfactants, such as non-ionic, anionic, cationic, zwitterionic and amphoteric surfactants, may also be present, although, as stated above, it is preferred that the majority, or indeed, all of emulsifier present consist of the defined non-alkoxylated water-soluble emulsification polymers.

According to a second aspect of the invention, a method of manufacture of the personal care compositions according to the invention is provided. The method comprises the following steps:

(a) Manufacturing a concentrated emulsion comprising at least 50% by weight of the emulsion of discontinuous oil phase, an aqueous continuous phase and emulsifier, wherein the emulsifier comprises a non-alkoxylated water-soluble emulsification polymer having a molecular weight of at least 3000 Daltons, a 0.1%wt aqueous solution of the water-soluble emulsification polymer having a surface tension of 15-60 mN/m (15-60 dynes/cm) when measured at 25°C;

(b) Manufacturing a pre-mix of the all other components of the personal care composition;

(c) Adding the concentrated emulsion to the pre-mix with continual mixing.

(d) Continuing mixing until a personal care composition of uniform consistency is obtained.

Advantageously, the method comprises the additional step (e) of continuing mixing until a desired oil phase particle size is obtained. Beneficially, the oil phase particle size is in the range from 1 to 20μm.

The concentrated emulsion prepared according to step (a) comprises from 0.01 to 30%wt, preferably from 0.25 to 12%wt, more preferably 0.25 to 5%wt of the personal care composition.

Step (a), above, defines the manufacture of a concentrated emulsion. A typical concentrated emulsion may contain 1-5% water-soluble emulsification polymer and 6-15% aqueous phase, although these ranges are not limiting. Typically, the aqueous phase comprises 100% water or a mixture of water and other water-soluble components. Preferably, the viscosity of the aqueous phase does not exceed 2 kg/ms (2000 cps), because, above this point, emulsification may become difficult.

There follow more details relating to performance of step (a): firstly, the water-soluble emulsification polymer is added to the aqueous phase with mixing. Following this, discrete batches of 2-3% of the total weight of oil are titrated sequentially into the aqueous phase accompanied by gentle mixing to obtain a uniform consistency prior to addition of the following batch. This is continued until around 20% of the total weight of oil has been added. In a second step, the remainder of the oil is now added more rapidly and in a continuous fashion with more vigorous mixing until a uniform emulsion comprising all the oil is obtained. In a third step, mixing is continued until a uniform consistency is obtained exhibiting a typical particle in a desired range. The concentrated emulsion obtained typically comprises above 70%, and more often from 80 to 93% internal oil phase by weight of the emulsion and forms a stable concentrate that may be stored or transported to other locations.

Step (b) of the manufacturing method involves the creation of a pre-mix of all other components of the personal care composition. The precise nature of these other components will depend on the nature of the final product, so that it is not possible to present an exhaustive list here. Non-limiting examples of other components include solvents, including water; thickeners; humectants, such as polyhydric alcohols, including glycerine and propylene glycol; pigments, including organic and inorganic pigments; preservatives; chelating agents, antimicrobials, perfumes. Surfactants, such as non-ionic, anionic, cationic, zwitterionic and amphoteric surfactants, may also be present, although, as stated above, it is preferred that the majority, or indeed, all of emulsifier present consist of the defined non-alkoxylated water-soluble emulsification polymers.

Steps (c) – (e) of the manufacturing method involve addition of the concentrated emulsion of step (a) to the pre-mix of step (b), mixing to achieve a uniform consistency and, preferably, further mixing to achieve a desired particle size. The mixing steps do not require any special conditions and may be carried out at room temperature and low shear mixing. The possibility of "cold mixing", i.e. mixing at ambient conditions without the application of heat, is a major advantage of the present method, since it permits great flexibility in the location in which process steps (b) – (e) may be carried out. In particular, cold mixing gives rise to fewer safety concerns.

Examples of personal care compositions which may be manufactured according to method of the invention include lotions for hand and body, shampoo compositions, make-up, perfume and perfume gel compositions.

Measurement Methods

Testing the solubility of the water-soluble emulsification polymers

As used herein in relation to the emulsification polymers, the term "water-soluble" includes polymers fulfilling the following condition: a 1%wt solution of the polymer in de-ionised water at room temperature gives at least 90% transmittance of light having a wavelength in the range from 455 to 800nm. Testing was carried out by passing the polymer solution through a standard syringe filter into a 1cm path length cuvette having a pore size of 450 nm and scanning using an HP 8453 Spectrophotometer arranged to scan and record across 390 to 800 nm. Filtration was carried out to remove insoluble components.

Measurement of surface tension

The method used for measuring surface tension of fluid is the so-called "Wilhelmy Plate Method". The Wilhelmy plate method is a universal method especially suited to establishing surface tension over time intervals. In essence, a vertical plate of known perimeter is attached to a balance, and the force due to wetting is measured. More specifically:

A 0.1%wt aqueous solution of water-soluble emulsification polymer is made up in de-ionised water. The polymer solution is then poured into a clean and dry glass vessel, the solution temperature being controlled at 25°C. The clean and annealed Wilhelmy Plate is lowered to the surface of the liquid. Once the plate has reached the surface the force which is needed to remove the plate out of the liquid is measured.

The equipment used and corresponding settings are as follows :

Device: Krüss Tensiometer K12, manufactured by Krüss GmbH, Borsteler Chausee 85-99a , 22453 Hamburg- Germany (see www.kruess.com).

Plate Dimensions: Width: 19.9mm; Thickness: 0.2mm; Height: 10mm

Measurement Settings: immersion depth 2mm, Surface Detection Sensitivity 0.01g, Surface Detection Speed 6mm/min, Values 10, Acquisition linear, Maximum Measurement Time 60sec

The plate is immersed in the fluid and the corresponding value of surface tension is read on the display of the device. Instructions can be found in the user manual edited by „Krüss GmbH Hamburg 1996" Version 2.1.

Examples

The following examples further describe and demonstrate the preferred embodiments within the scope of the present invention. The examples are given solely for the purpose of illustration, and are not to be construed as limitations of the present invention since many variations thereof are possible without departing from its scope.

Example 1: Hand and Body Lotion

Concentrated Oil-In-Water Emulsion		
Material	**%wt**	**Weight (g)**
Isohexadecane	58.37	583.7
Isopropyl isostearate	14.60	146.0
DL tocopheryl acetate	2.43	243
Dow Corning 1503[1]	14.60	146.0
EZ Sperse[2]	4.00	40.0
Water	6.00	60.0

[1]Dow Corning 1503 fluid is a dimethicone and dimethiconol produced by Dow Corning

[2]EZ Sperse is a 25% solution of mono butyl ester of poly(methyl vinyl maleic acid sodium salt) and is a copolymer of maleic anhydride and methyl vinyl ether reacted with water/butanol to form a half ester, which is neutralised with sodium hydroxide. EZ Sperse is produced by ISP Corp.

Procedure to make a 1000g batch of concentrated oil-in-water emulsion

Isohexadecane, isopropyl isostearate and DL-tocopheryl acetate were mixed using a Kitchen Aid Ultra Power Mixer until uniform. The water and EZ Sperse were mixed in the same way. The isohexadecane/isopropyl isostearate/DL-tocopheryl acetate were then added to the water/EZ Sperse at a rate of 8g/minute while continually mixing with a Kitchen Aid Ultra Power Mixer having a paddle attachment at a setting of "4". Following complete addition,

the Dow Corning 1503 was added to the mixture at the same rate and mixed in the same way until a uniform mixture was obtained.

Hand and Body Lotion		
Material	**%wt**	**Weight (g)**
Deionised water	69.92	699.2
Glycerine	5.00	50.0
Phenonip[3]	1.00	10.0
D-Panthenol	0.50	5.0
Sepigel 305[4]	4.00	40.0
System 3 AM900[5]	5.33	53.3
System 3 AM500[6]	4.00	40.0
Concentrated oil-in-water emulsion	10.28	102.8

[3]Phenoxyethanol and Methyl-, Ethyl-, Buyl-, Popyl and Isobutylparaben from Nipa Labs Inc.
[4]Seppigel 305 is polyacrylamide & C13-14 isoparaffin & laureth-7 and is available from Seppic Group.
[5]System 3 AM500 is a mixture of water, petrolatum, lecithin, hydrogenated lecithin, and polyphosphorylcholine glycol acrylate commercialised by Collaborative Laboratories Inc.
[6]System 3 AM900 is a mixture of water, cetearyl alcohol, hydrogenated polyisobutene, lecithin, hydrogenated lecithin, butylene glycol and polyphosphorylcholine glycol acrylate commercialised by Collaborative Laboratories Inc.

Procedure to make a 1000g batch of hand and body lotion

All mixing was carried out using a Kitchen Aid Ultra Power Mixer with a paddle attachment and a speed setting of "2".

The de-ionised water, glycerine, Phenonip and d-panthenol were mixed until uniform at which point the Sepigel 305 was dispersed into the mixture and also mixed until uniform. Following this, the System 3 AM900 was added to the mixture and mixed until uniform, the System 3 AM500 was added and mixed until uniform and finally the concentrated oil-in-water emulsion was added to the mixture and mixed in to create a hand and body lotion of uniform consistency.

Example 2: Make-up foundation

Pigment Pre-Mix	
Material	**%wt**
Water	2.000
Ganex P904[5]	8.000
BTD 401[1]	9.075
BEYO 12[2]	0.811
BERO 12[3]	0.262
BEBO 12[4]	0.143

[1]Kobo Products Inc., titanium dioxide and isopropyl titanium triisostearate

[2]Kobo Products Inc., hydrated ferric oxide and isopropyl titanium triisostearate

[3]Kobo Products Inc., ferric oxide and isopropyl titanium triisostearate

[4]Kobo Products Inc., iron oxide and isopropyl titanium triisostearate

[5]Butylated polyvinylpyrollidone obtained from ISP Corp., Inc.

Procedure to make pigment pre-mix

The Ganex P904 and water were mixed using a Kitchen Aid Ultra Power Mixer until uniform. The pigments were then added to the Ganex P904/water and mixed using a Cito Unguator mixer for 1 minute at a setting of 5.

Concentrated Oil-In-Water Emulsion		
Material	**%wt**	**Weight (g)**
Tridecyl neopentonate	23.69	236.9
Dow Corning 246 Fluid[6]	56.83	568.3
Dow Corning 245 Fluid[7]	9.48	94.8
EZ Sperse	2.50	25.0
Water	7.50	75.0

[6]Cyclohexsiloxane fluid produced by Dow Corning

[7]Cyclopentasiloxane fluid produced by Dow Corning

Procedure to make a 1000g batch of concentrated oil-in-water emulsion

Tridecyl neopentanoate, Dow Corning 245 and 246 were mixed using a Kitchen Aid Ultra Power Mixer until uniform. The water and EZ Sperse were mixed in the same way. The Tridecyl neopentanoate/Dow Corning 245 and 246 were then added to water/EZ Sperse at a rate of 8g/minute while continually mixing with a Kitchen Aid Ultra Power Mixer having a paddle attachment at a setting of "4".

Make-Up Foundation	
Material	**%wt**
Water	45.7
Phenonip	1.0
Glycerine	6.0
Dry Flow Elite BN[8]	3.0
Seppigel 305	3.0
Pigment Pre-Mix	20.3
Concentrated oil-in-water emulsion	21.0

[8]Aluminium starch octylsuccinate and boron nitride obtainable from National Starch & Chemical

Procedure to make make-up foundation

All mixing was carried out using a Kitchen Aid Ultra Power Mixer with a paddle attachment and a speed setting of "2".

The Phenonip was dispersed in the water and mixed. The Dry Flo Elite BN was dispersed in the glycerine and mixed until uniform, then the glycerine/Dry Flow Elite BN was added to the Phenonip/water and mixed until uniform. The Seppigel 305 was added to the mixture and mixed until smooth and lump free. At this point, the pigment was mixed in and mixing was continued until the colour was uniform. Lastly, the concentrated oil-in-water emulsion was mixed in until uniform to create the finished make-up foundation.

Example 3: perfume gel

Concentrated Oil-In-Water Emulsion		
Material	**%wt**	**Weight (g)**
EZ Sperse	2.5	25
Water	17.5	175
Fragrance Oil	80.0	800

Procedure to make the concentrated oil-in-water emulsion

The EZ Sperse and 7.5%wt water were mixed using a Kitchen Aid Ultra Power Mixer until uniform. The fragrance oil was then added at a rate of 8g/minute while continually mixing with a Kitchen Aid Ultra Power Mixer having a paddle attachment at a setting of "4". Due to the high viscosity, the emulsion was then diluted with the remainder of the water while continually mixing with a Kitchen Aid Ultra Power Mixer having a paddle attachment at a setting of "4".

Perfume Gel	
Material	**%wt**
Deionised water	86.5
Seppigel 305	3.5
Concentrated perfume o/w emulsion	10.0

Procedure to make perfume gel

All mixing was carried out using a Kitchen Aid Ultra Power Mixer with a paddle attachment and a speed setting of "2".

The Seppigel 305 was dispersed in the water and mixed until a smooth gel was obtained, at which point the perfume o/w emulsion was added and mixed until a uniform consistency perfume gel was produced.

Example 8: wax emulsion

This example relates to the generation of a concentrated emulsion comprising a wax-based oil phase. The concentrated emulsion would be suitable for incorporation into the personal care compositions according to the invention, such as those in the preceding examples.

Concentrated Oil-In-Water Emulsion		
Material	**%wt**	**Weight (g)**
EZSperse	5.0	50
Water	5.0	50
Glycerine (99%)	10.0	100
USP Petrolatum	80.0	800

Procedure to make oil-in-water emulsion

The EZSperse, water and glycerine are mixed until uniform. This mixture was heated to 70°C. Separately, the petrolatum was also heated to 70°C. The petrolatum was then slowly added to the aqueous phase and continuously mixed with a Kitchen Aid Mixer equipped with a paddle blade. Mixing was continued until a uniform consistency was obtained.

It is understood that the examples and embodiments described herein are for illustrative purposes only and that various modifications or changes in light thereof will be suggested to one skilled in the art without departing from the scope of the present invention.

All documents cited in the Detailed Description of the Invention are, in relevant part, incorporated herein by reference; the citation of any document is not to be construed as an admission that it is prior art with respect to the present invention.

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.

WHAT IS CLAIMED IS:

1. A personal care composition comprising an emulsion; wherein the emulsion comprises;

a) an aqueous continuous phase;

b) a discontinuous oil phase;

c) an emulsifier; and

wherein the emulsifier comprises a non-alkoxylated water-soluble emulsification polymer having a molecular weight of at least about 3000 Daltons, a 0.1%wt aqueous solution of the water-soluble emulsification polymer having a surface tension of about 15 to about 60 mN/m (about 15 to about 60 dynes/cm) when measured at about 25°C.

2. The personal care composition of claim 1, wherein at least about 70% of the total weight of emulsifier consisting of one or more non-alkoxylated water-soluble emulsification polymers.

3. The personal care composition of claim 1, wherein the emulsifier consists of at least one non-alkoxylated water-soluble emulsification polymers.

4. The personal care composition of claim 1, wherein the oil phase has a Hildebrand Solubility Parameter of about 5 to about 12 calories/cc (about 209 to about 502 kJoule/m^2).

5. The personal care composition of claim 1, wherein the oil phase has a viscosity from about 0.005cm^2/s to about 30,000cm^2/s.

6. The personal care composition of claim 1, wherein the water-soluble emulsification polymer has an average molecular weight greater than about 10,000 Daltons.

7. The personal care composition of claim 1, wherein the emulsification polymer has an average molecular weight of less than about 130 kiloDaltons.

8. The personal care composition of claim 1, comprising from about 0.001% to about 5% by weight of the water-soluble of the emulsification polymer.

9. The personal care composition of claim 1, comprising from about 0.1 to about 1% by weight of the water-soluble emulsification polymer.

10. The personal care composition of claim 1, wherein the emulsifier comprises the water-soluble emulsification polymers selected from the group consisting of mono alkyl esters of poly(methyl vinyl ether/maleic acid) sodium salt; alkylated polyvinylpyrrolidone; terephthalate polyesters and (3-dimethylaminopropyl)-methacrylamide/3-methacryloylamidopropyl-lauryl-dimthyl-ammonium chloride and mixtures thereof.

11. The personal care composition of claim 1, wherein the composition is selected from the group consisting of a lotion, a shampoo, a make-up, a perfume gel.

12. The personal care composition of claim 11, wherein the lotion is a hand lotion and a body lotion.

13. The personal care composition comprising an emulsion, wherein the emulsion comprises;

a) an aqueous continuous phase;

b) a discontinuous oil phase;

c) an emulsifier; and

wherein the emulsifier consists of at least one non-alkoxylated water-soluble emulsification polymer, wherein the non-alkoxylated water soluble emulsification polymer having an average molecular weight of at least about 10,000 Daltons; wherein a 0.1%wt aqueous solution of the water-soluble emulsification polymer has a surface tension of about 15-60 mN/m (15-60 dynes/cm) when measured at about 25°C.

14. A personal care composition comprising an emulsion wherein the emulsion comprises;

a) an aqueous continuous phase;

b) a discontinuous oil phase;

c) an emulsifier; and

wherein the emulsifier comprises at least one water-soluble emulsification polymers selected from the group consisting of mono alkyl esters of poly(methyl vinyl ether/maleic acid) sodium salt; alkylated polyvinylpyrrolidone; terephthalate polyesters and (3-dimethylaminopropyl)-methacrylamide/3-methacryloylamidopropyl-lauryl-dimthyl-ammonium chloride and mixtures thereof.

15. A personal care composition comprising an emulsion, wherein the emulsion comprises:

a) an aqueous continuous phase;

b) a discontinuous oil phase;

c) an emulsifier; and

wherein the emulsifier comprises at least one non-alkoxylated water-soluble emulsification polymer; the non-alkoxylated water soluble emulsification polymer having an average molecular weight of at least about 10,000 Daltons; wherein a 0.1%wt aqueous solution of the water-soluble emulsification polymer has a surface tension of about 15-60 mN/m (15-60 dynes/cm) when measured at about 25°C; wherein at least one of the water-soluble emulsification polymers is a film-forming polymer.

16. A method of manufacture of a personal care composition comprising the steps of:

(a) Manufacturing a concentrated emulsion comprising at least about 50% by weight of the emulsion of discontinuous oil phase, an aqueous continuous phase and emulsifier, wherein the emulsifier comprises a non-alkoxylated water-soluble emulsification polymer having a molecular weight of at least about 3000 Daltons, a 0.1%wt aqueous solution of the water-soluble emulsification polymer having a surface tension of about 15 to about 60 mN/m (about 15 to about 60 dynes/cm) when measured at about 25°C;

(b) Manufacturing a pre-mix of the all other components of the personal care composition;

(c) Adding the concentrated emulsion to the pre-mix with continual mixing.

(d) Continuing mixing until a personal care composition of uniform consistency is obtained.

17. The method of claim 16 further comprising the additional step (e) of continuing mixing until a desired oil phase particle size is obtained.

18. The method of claim 17, wherein the oil phase particle size is from about 1 to about 20μm.

19. The method of claim 16, wherein the concentrated emulsions comprises from about 0.01 to about 30%wt of the personal care composition.

20. The method of claim 16, wherein the concentrated emulsions comprises from about 0.25 to about 5%wt of the personal care composition.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61K7/00

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)
IPC 7 A61K

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

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

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DALLAL J: "POLYQUATERNIUM-55: A NEW FORCE IN STYLING POLYMERS" COSMETICS & TOILETRIES, WHEATON, IL, US, vol. 117, no. 12, December 2002 (2002-12), pages 33-34,36, XP009024595 ISSN: 0361-4387 Formula 3	1-20
X	WO 97/09027 A (ISP INVESTMENTS INC) 13 March 1997 (1997-03-13) page 6 example 7	1-20
X	US 5 658 559 A (SMITH JAMES A) 19 August 1997 (1997-08-19) column 4, line 14 - line 32 claim 1	1-20

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
15 December 2004	27/12/2004

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