



(51) International Patent Classification:

A61K 8/42 (2006.01) A61K 8/86 (2006.01)

A61K 8/36 (2006.01) A61Q 17/04 (2006.01)

A61K 8/37 (2006.01) A61K 8/46 (2006.01)

A61K 8/55 (2006.01) A61K 8/06 (2006.01)

(21) International Application Number:

PCT/BR2018/050212

(22) International Filing Date:

28 June 2018 (28.06.2018)

(25) Filing Language:

English

(26) Publication Language:

English

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,

SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: SURFACTANT SYSTEM AND SUNSCREEN COMPOSITION COMPRISING IT

(57) Abstract: The present invention is directed to a new surfactant system for sunscreen compositions, a sunscreen composition with high SPF, the process of manufacturing the composition and its uses. Also, the composition of the present invention presents easy application, good spreadability and less silicon effect, less white film, less shine, which does not run on high temperature in the face, has an imperceptible touch, gives the ideal balance between hydration and oil control, reduces impurities accumulation, reinforces the barrier against pollution, leaves the facial skin breathing, combines high protection with smoothness to the skin, sweat resistant, prepare the skin for the make-up, renew the skin quality, let the skin breathe, purified skin sensation and soothing effect to the skin. Also, the composition of the present invention is stable over the time.



**SURFACTANT SYSTEM, SUNSCREEN COMPOSITION, USE OF A SUNSCREEN
COMPOSITION AND PROCESS OF MANUFACTURING THE SUNSCREEN
COMPOSITION**

FIELD OF THE INVENTION

5 The present invention is directed to a new surfactant system for sunscreen compositions, a sunscreen composition with high SPF, the process of manufacturing the composition and its uses.

BACKGROUND OF THE INVENTION

10 Conventional sunscreen products generally take the form of sunscreen filter actives that are solubilized, emulsified or dispersed in a cosmetically or physiologically acceptable carrier, which is topically applied to the skin.

 The degree of UV protection afforded by a sunscreen composition is directly related to the amount and type of UV filters contained therein. The higher the amount of UV filters, the greater the degree of UV protection (UVA/UVB).

15 Particularly, sunscreen compositions must provide good protection against the sun, a measure of which is the Sun Protection Factor (SPF) value, yet have satisfactory sensory perception, such as a smooth but not greasy feel upon application. However, this combination of properties has been difficult to achieve, particularly because many active sunscreen compounds themselves have an oily or greasy feel,
20 and increasing their content tends to cause the final product to suffer from that effect.

 Also, most organic sunscreen filters are oil-like and/or oil-soluble materials. High levels of sunscreen filters in sunscreen products render the products less appealing for their greasy skin feel, stickiness, long drying time, and leave shiny residue on the skin after application. The filters also have the tendency to whiten the
25 skin after application and after becoming wet with water or perspiration which is an undesirable attribute.

 Also, considering the great amount of sunscreen filters in the O/W emulsion, it tends to be instable.

30 Therefore, it is desired a stable sunscreen composition with high SPF associated with easy application, good spreadability and less silicon effect, less white film, less shine, which does not run on high temperature in the face, has an imperceptible touch, gives the ideal balance between hydration and oil control, reduces impurities accumulation, reinforces the barrier against pollution, leaves the facial skin breathing, combines high protection with smoothness to the skin, sweat resistant,

prepare the skin for the make-up, renew the skin quality, let the skin breathe, purified skin sensation and soothing effect to the skin.

The challenge of formulating a sunscreen composition having high SPF associated with the unique sensorial described above is that such composition uses high amounts of ingredients (UV filters) and tends to be instable and ineffective.

Thus, the inventors succeeded to overcome the problems of the state of the art and surprisingly revealed a stable sunscreen composition with high SPF through the use of a new surfactant system.

SUMMARY OF THE INVENTION

The present invention is directed to a new surfactant system that provides stable sunscreen compositions with high SPF.

Also, the present invention is directed to a sunscreen composition comprising (a) a surfactant system, (b) a polylactic acid-based resin (PLA), (c) a mattifying powder and (d) UV filters.

The composition of the present invention presents a high level of UV-protection in order to protect the skin from the damages of the sun, easy application, good spreadability and less silicon effect, less white film, less shine, which does not run on high temperature in the face, has an imperceptible touch, gives the ideal balance between hydration and oil control, reduces impurities accumulation, reinforces the barrier against pollution, leaves the facial skin breathing, combines high protection with smoothness to the skin, sweat resistant, prepare the skin for the make-up, renew the skin quality, let the skin breathe, purified skin sensation and soothing effect to the skin. Also, the composition of the present invention is stable over the time.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows microscopic photos demonstrating the superior stability and robustness of the composition of the present invention (comprising the surfactant system) in view of the composition of the state of the art (without the surfactant system).

DETAILED DESCRIPTION OF THE INVENTION

In an embodiment, the present invention is directed to a surfactant system comprising a mixture of surfactants, which comprises:

- (i) a mixture of at least three stearyl derivatives compounds;
- (ii) a phosphate surfactant;
- (iii) sodium salt of the stearic acid amide.

In a preferred embodiment, the mixture of at least three stearyl derivatives compounds comprises stearic acid, glyceryl stearate and PEG-100 stearate and stearyl alcohol.

5 In a preferred embodiment, the amount of the mixture of at least three stearyl derivatives compounds is ranging from about 1 to 30% by weight and preferably from about 2.5 to about 8% by weight, or more preferably from about 3 to about 6% by weight, including all ranges and sub-ranges there between, relative to the total weight of the composition.

10 The mixture of at least three stearyl derivatives compounds employs a first surfactant in an amount preferably ranging from about 0.1 to about 10% by weight and preferably from about 0.3 to about 5% by weight, or more preferably from about 0.5 to about 3% by weight, including all ranges and sub-ranges there between, relative to the total weight of the composition.

15 In a preferred embodiment, the mixture of at least three stearyl derivatives compounds employs a second surfactant in an amount preferably ranging from about 0.05 to about 10% by weight and preferably from about 0.1 to about 6% by weight, or more preferably from about 0.2 to about 3% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

20 In a preferred embodiment, the mixture of at least three stearyl derivatives compounds employs a third surfactant in an amount preferably ranging from about 0.05 to about 10% by weight and preferably from about 0.1 to about 5% by weight, or more preferably from about 0.1 to about 2% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

25 In a preferred embodiment, the phosphate surfactant is selected from monoalkyl phosphates, potassium cetyl phosphate, dialkyl phosphates, salts of monoalkyl phosphates, salts of dialkyl phosphates, and mixtures thereof. More preferably, the monoalkyl phosphates and dialkyl phosphates comprise one or more linear or branched and aliphatic and/or aromatic alkyl chains having from 8 to 22 carbon atoms. According to preferred embodiments, the phosphate surfactant(s) can
30 be neutralized with organic or inorganic bases such as, for example, potassium hydroxide, sodium hydroxide, triethanolamine, arginine, lysine and N-methylglucamine to form the aforementioned salts.

Suitable examples of phosphate surfactants include, but are not limited to, monolauryl phosphate, the potassium salt of dodecyl phosphate, such as the

mixture of mono- and diester (predominantly diester), the octyl monoester and the octyl diester of phosphoric acid, the ethoxylated (7 mol. of EO) 2-butyloctanol monoester and the ethoxylated (7 mol. of EO) 2-butyloctanol diester of phosphoric acid, the potassium or triethanolamine salts of monoalkyl (C₁₂-C₁₃) phosphate, potassium lauryl phosphate, such as the product as a 40% aqueous solution, potassium cetyl phosphate, and the mixtures of these surfactants.

The phosphate surfactant is present in the surfactant system in a range of from about 0.05 to about 10% by weight and preferably from about 0.1 to about 5% by weight, or more preferably from about 0.2 to about 3% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

In a preferred embodiment, the sodium salt of the stearic acid amide is selected from sodium methyl stearyl taurate.

The sodium salt of the stearic acid amide is present in the composition in a range of from about 0.05 to about 10% by weight and preferably from about 0.1 to about 4% by weight, or more preferably from about 0.2 to about 1% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

In a preferred embodiment, the surfactant system of the invention is used in a sunscreen composition.

The sunscreen composition of the present invention comprises:

- (a) a surfactant system;
- (b) UV filters;
- (c) a polylactic acid-based resin (PLA); and
- (d) a mattifying powder.

The composition according to the invention provides excellent sensorial performance as well as surprisingly high SPF values associated to a strong stability of the composition over time.

The pH of the sunscreen composition of the invention is preferably within the range of about 6.0 to about 7.6, more preferably, of about 6.5.

In an embodiment, the amount of the surfactant system in the sunscreen composition of the invention ranges from about 0.2 to about 8% by weight, or from about 0.3 to about 7% by weight, from about 0.5 to about 5% by weight or from about 0.6 to about 4.5% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

The amount of the UV filters in the sunscreen composition of the invention ranges from about 3% to about 40% by weight, preferably in an amount of from about 5% to about 25% by weight, and most preferably about 7% to about 18% by weight, based on the total weight of the composition.

5 The amount of the polylactic acid-based resin (PLA) in the sunscreen composition of the invention ranges from about 0.1 to about 3% by weight, or from about 0.2 to about 2% by weight, or from about 0.1 to about 1% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

10 The amount of the mattifying agent in the sunscreen composition of the invention ranges from about 0.01% to about 10% by weight, preferably in an amount of from about 0.1% to about 5% by weight, and most preferably about 0.5% to about 4% by weight, based on the total weight of the composition.

In a preferred embodiment, the sunscreen composition of the present invention may present a Sun Protection Factor ranging from 30 to 80.

15 In various embodiments, the sunscreen composition of the present invention may present a Sun Protection Factor of 30, 35, 40, 45, 50, 55, 60, 65, 70 and 80.

In an embodiment, the sunscreen composition of the present invention may present a Sun Protection Factor of 50.

20 In an embodiment, the sunscreen composition of the present invention may present a Sun Protection Factor of 60.

In an embodiment, the sunscreen composition of the present invention may present a Sun Protection Factor of 70.

25 In an embodiment, the sunscreen composition of the present invention may present a Sun Protection Factor of 80.

The sunscreen composition of the invention is in the form of an oil in water (O/W) emulsion.

The sunscreen composition of the invention can be used as a daily product for the skin.

30 The sunscreen composition of the present invention presents easy application, good spreadability and less silicon effect, less white film, less shine, which does not run on high temperature in the face, has an imperceptible touch, gives the ideal balance between hydration and oil control, reduces impurities accumulation, reinforces the barrier against pollution, leaves the facial skin breathing, combines high

protection with smoothness to the skin, sweat resistant, prepare the skin for the make-up, renew the skin quality, let the skin breathe, purified skin sensation and soothing effect to the skin. Also, the composition of the present invention is stable over time.

The present invention is also related to a process of manufacturing a
5 sunscreen composition for preventing sunburns that provides for the consumer feeling of comfort in extreme conditions of heat and sweat.

In another preferred embodiment, the present invention is related to the use of a composition for manufacturing a sunscreen for preventing sunburn.

Terms

10 As used herein, the expression "at least" means one or more and thus includes individual components as well as mixtures/combinations.

Other than in the operating examples, or where otherwise indicated, all numbers expressing quantities of ingredients and/or reaction conditions are to be understood as being modified in all instances by the term "about," meaning within +/-
15 5% of the indicated number.

As used herein, all ranges provided are meant to include every specific range within, and combination of sub ranges between, the given ranges. Thus, a range from 1-5, includes specifically 1, 2, 3, 4 and 5, as well as sub ranges such as 2-5, 3-5, 2-3, 2-4, 1-4, etc. All ranges and values disclosed herein are inclusive and combinable.
20 For examples, any value or point described herein that falls within a range described herein can serve as a minimum or maximum value to derive a sub-range, etc.

Additional Surfactants

The suitable surfactant system of the present invention may comprise additional surfactants that could be chosen among the surfactants described below.

25 Anionic surfactants useful in the invention include, for example, carboxylates (sodium 2-(2-hydroxyalkyloxy)acetate), amino acid derivatives (N-acylglutamates, N-acylglycinates or acylsarcosinates), alkyl sulfates, alkyl ether sulfates and oxyethylenated derivatives thereof, sulfonates, isethionates and N-acylisethionates, taurates and N-acyl N-methyltaurates, sulfosuccinates, alkyl
30 sulfoacetates, phosphates and alkyl phosphates, anionic derivatives of alkyl polyglycoside (acyl-D-galactoside uronate), and mixtures thereof.

Non-limiting examples of non-ionic surfactants useful in the invention include, for example, oxyalkylenated (more particularly polyoxyethylenated) fatty acid esters of glycerol; oxyalkylenated fatty acid esters of sorbitan; oxyalkylenated

(oxyethylenated and/or oxypropylenated) fatty acid esters; oxyalkylenated (oxyethylenated and/or oxypropylenated) fatty alcohol ethers; sugar esters, for instance sucrose stearate; fatty alcohol ethers of sugars, especially alkyl polyglucosides (APGs) such as decyl glucoside and lauryl glucoside, cetostearyl glucoside optionally as a mixture with cetostearyl alcohol, and also arachidyl glucoside, for example in the form of a mixture of arachidyl alcohol, behenyl alcohol and arachidyl glucoside. According to one particular embodiment of the invention, the mixture of the alkyl polyglucoside as defined above with the corresponding fatty alcohol may be in the form of a self-emulsifying composition. Mention may also be made of lecithins and derivatives (e.g. Biophilic), sugar esters and sodium stearyl lactylate.

Non-limiting examples of fatty acids chosen from C₁₂-C₂₂ higher fatty acids, such as myristic acid, oleic acid, linoleic acid, linolenic acid, lauric acid, palmitic acid, and mixtures thereof.

UV Filters

Non-limiting suitable UV filters of the present invention could be as follows:

Oil-soluble organic sunscreen ingredient

The "oil-soluble organic sunscreen ingredient" means any organic compound for screening out UV radiation, which can be fully dissolved in molecular form or miscible in an oil phase or which can be dissolved in colloidal form (for example in micellar form) in an oil fatty phase.

Non-limiting examples of oil-soluble organic sunscreen ingredients useful in the invention include, for example, cinnamic derivatives; anthranilates; salicylic derivatives; dibenzoylmethane derivatives; camphor derivatives; benzophenone derivatives; diphenylacrylate derivatives; triazine derivatives; benzotriazole derivatives; benzalmalonate derivatives, especially those cited in patent US5624663; benzimidazole derivatives; imidazolines; bis-benzoazolyl derivatives as described in patents EP669323 and US2463264; p-aminobenzoic acid (PABA) derivatives; methylene bis(hydroxyphenylbenzotriazole) derivatives as described in applications US5237071, US5166355, GB2303549, DE19726184 and EP893119; benzoxazole derivatives as described in patent applications EP0832642, EP1027883, EP1300137 and DE10162844; screening polymers and screening silicones such as those described especially in patent application WO 93/04665; dimers derived from alkylstyrene such as those described in patent application DE 19855649; 4,4-

diarylbutadienes such as those described in patent applications EP0967200, DE19746654, DE19755649, EP-A-1008586, EP1133980 and EP1133981, merocyanine derivatives such as those described in patent applications WO 04/006878, WO 05/058269 and WO 06/032741; and mixtures thereof, the entire
5 contents of the patents and patent applications being incorporated by reference in their entirety.

As examples of other suitable oil-soluble organic sunscreen ingredients, mention may be made of those denoted hereinbelow under their INCI name:

Cinnamic derivatives:

10 Examples of suitable cinnamic derivatives include, but are not limited to, ethylhexyl methoxycinnamate, isopropyl methoxycinnamate, isoamyl methoxycinnamate, DEA methoxycinnamate, diisopropyl methylcinnamate, glyceryl ethylhexanoate dimethoxycinnamate.

Dibenzoylmethane derivatives:

15 Examples of suitable dibenzoylmethane derivatives include, but are not limited to, butyl methoxydibenzoylmethane and isopropyl dibenzoylmethane.

Salicylic derivatives:

Examples of suitable salicylic derivatives include, but are not limited to, homosalate, ethylhexyl salicylate, dipropylene glycol salicylate and TEA salicylate.

20 Beta, beta -Diphenylacrylate derivatives:

Examples of suitable beta, beta -diphenylacrylate derivatives include, but are not limited to, octocrylene and etocrylene.

Benzophenone derivatives:

25 Examples of suitable benzophenone derivatives include, but are not limited to, benzophenone-1, benzophenone-2, benzophenone-3 or oxybenzone, benzophenone-4, benzophenone-5, benzophenone-6, benzophenone-8, benzophenone-9, benzophenone-12, n-hexyl 2-(4-diethylamino-2-hydroxybenzoyl)benzoate +” or as a mixture with octyl methoxycinnamate.

Benzylidenecamphor derivatives:

30 Examples of suitable benzylidenecamphor derivatives include, but are not limited to, 3-benzylidene camphor manufactured, 4-methylbenzylidene camphor, polyacrylamidomethyl benzylidene camphor manufactured.

Phenylbenzotriazole derivatives:

Examples of suitable phenylbenzotriazole derivatives include, but are not

limited to, drometrizole trisiloxane, methylene bis-benzotriazolyl tetramethylbutylphenol, or in micronized form as an aqueous dispersion.

Triazine derivatives:

Examples of suitable triazine derivatives include, but are not limited to, bis-ethylhexyloxyphenol methoxyphenyl triazine, ethylhexyl triazone, diethylhexyl butamido triazone, 2,4,6-tris(dineopentyl 4'-aminobenzalmalonate)-s-triazine, 2,4,6-tris(diisobutyl 4'-aminobenzalmalonate)-s triazine, 2,4-bis(dineopentyl 4'-aminobenzalmalonate)-6-(n-butyl 4'-aminobenzoate)-s-triazine, symmetrical triazine screening agents described in patent US 6,225,467, patent application WO 2004/085412 (see compounds 6 and 9) or the document "Symmetrical Triazine Derivatives" IP.COM Journal, IP.COM Inc., West Henrietta, NY, US (20 September 2004), especially 2,4,6-tris(biphenyl)-1,3,5-triazines (in particular 2,4,6-tris(biphenyl-4-yl)-1,3,5-triazine and 2,4,6-tris(terphenyl)-1,3,5-triazine, which is included in patent applications WO 06/035000, WO 06/034982, WO 06/034991, WO 06/035007, WO 2006/034992 and WO 2006/034985).

Anthranilic derivatives:

An example of a suitable anthranilic derivative includes, but is not limited to, menthyl anthranilate.

Imidazoline derivatives:

An example of a suitable imidazoline derivative includes, but is not limited to, ethylhexyl dimethoxybenzylidene dioxoimidazoline propionate.

Benzalmalonate derivatives:

An example of a suitable Benzalmalonate derivative includes, but is not limited to, polyorganosiloxane containing benzalmalonate functions, for instance polysilicone-15.

4,4-Diarylbutadiene derivatives:

An example of a suitable 4,4-diarylbutadiene derivative includes, but is not limited to, 1-Dicarboxy(2,2'-dimethylpropyl)-4,4-diphenyl-butadiene.

Benzoxazole derivatives:

An example of suitable benzoxazole derivative includes, but is not limited to, 2,4-bis[5-(1-dimethylpropyl)benzoxazol-2-yl-(4-phenyl)imino]-6-(2-ethylhexyl)imino-1,3,5-triazine, and mixtures thereof.

Preferably, the oil-soluble organic sunscreen ingredient will be chosen from butyl methoxydibenzoylmethane, ethylhexyl salicylate, ethylhexyl triazone,

octocrylene, drometrizole trisiloxane, bis-ethylhexyloxyphenol methoxyphenyl triazine, and mixtures thereof.

The oil-soluble organic sunscreen ingredient is preferably present in the composition according to the invention in an amount of from about 3% to about 25% by weight, preferably in an amount of from about 5% to about 20% by weight, and most preferably about 7% to about 18% by weight, based on the total weight of the composition.

Water-soluble organic sunscreen ingredient

The "water-soluble organic sunscreen ingredient" means any organic compound for screening out UV radiation, which can be fully dissolved in molecular form or miscible in a liquid aqueous phase or which can be dissolved in colloidal form (for example in micellar form) in a liquid aqueous phase.

Non-limiting examples of water-soluble organic sunscreen ingredients useful in the invention include, for example, terephthalylidene dicamphor sulfonic acid (Ecamsule), phenylbenzimidazole sulfonic acid (Ensulizole), benzophenone-4, aminobenzoic acid (PABA), 4-Bis(polyethoxy)-para-aminobenzoic acid polyethoxyethyl ester (PEG-25 PABA), camphor benzalkonium methosulfate, methylene bis-benzotriazolyl tetramethylbutylphenol (Bisotrizole), disodium phenyl dibenzimidazole tetrasulfonate (Bisdisulizole disodium), and tris-biphenyl triazine; their derivatives and corresponding salts; naphthalene bisimide derivatives such as those described in European patent application EP1990372 A2, the entire contents of which is hereby incorporated by reference; and cinnamido amine cationic quaternary salts and derivatives such as those described in United States Patent 5,601,811, the entire contents of which is hereby incorporated by reference, and mixtures thereof.

The salts of the compounds that may be used according to the invention are chosen in particular from salts of alkali metals, for example sodium or potassium; salts of alkaline-earth metals, for example calcium, magnesium or strontium; metal salts, for example zinc, aluminum, manganese or copper; salts of ammonium of formula NH_4^+ ; quaternary ammonium salts; salts of organic amines, for instance salts of methylamine, dimethylamine, trimethylamine, triethylamine, ethylamine, 2-hydroxyethylamine, bis(2-hydroxyethyl)amine or tris(2-hydroxyethyl)amine; lysine or arginine salts. Salts chosen from sodium, potassium, magnesium, strontium, copper, manganese or zinc salts are preferably used. The sodium salt is preferably used.

Preferably, the water-soluble organic sunscreen ingredient will be chosen from terephthalylidene dicamphor sulfonic acid, methylene bis-benzotriazolyl

tetramethylbutylphenol, and mixtures thereof.

The water-soluble organic sunscreen ingredient is preferably present in the composition according to the invention in an amount of from about 0.1% to about 10% by weight, preferably in an amount of from about 0.5% to about 8% by weight, and most preferably about 1% to about 7% by weight, based on the total weight of the composition.

Silica-coated titanium dioxide sunscreen ingredient

The “silica-coated titanium dioxide sunscreen ingredient” means spherical beads which are formed by encapsulating titanium dioxide particles in silica.

Non-limiting examples of silica coated titanium dioxide sunscreen ingredients useful in the invention include, for example, titanium dioxide coated with silica, such as name silica (and) titanium dioxide having a composition of silica:titanium dioxide of about 55:45 and having a particle size from about 2 microns to about 7 microns.

The silica-coated titanium dioxide sunscreen ingredient is preferably present in the composition according to the invention in an amount of from about 1% to about 10% by weight, preferably in an amount of from about 2% to about 10% by weight, and most preferably about 5% to about 10% by weight, based on the total weight of the composition.

The suitable UV filter system of the present invention comprises terephthalylidene dicamphor sulfonic acid, octocrylene and butyl methoxydibenzoylmethane sulfonic acid.

According to the invention, the concentration of the mixture of sunscreen/UV filters in the system may be between about 3% to about 40%, preferably between about 5% to about 25% and even more preferably between about 7 to about 18% by weight of the total weight of the composition.

Polylactic acid (PLA)

The compositions of the invention comprise porous microparticles of a polylactic acid-based resin, sometimes referred to herein as “polylactic acid microparticles” or “PLA.”

The PLA microparticles may have an enthalpy of fusion of 5 J/g or more, preferably 10 J/g or more, more preferably 20 J/g or more, and most preferably 30 J/g or more. Further, the upper limit is preferably 100 J/g or less, although it is not limited in particular. Enthalpy of fusion refers to a value calculated from a peak area, which

shows heat capacity of fusion at approximately 160°C, in a differential scanning calorimetry (DSC) where a temperature is raised to 200°C with the temperature rise of 20°C per minute.

Enthalpy of fusion can be adjusted by controlling the co-polymerization ratio (L/D) between L-lactic acid and D-lactic acid which constitute the polylactic acid-based resin. When the L/D ratio is 95/5 or more, enthalpy of fusion becomes 5 J/g or more and the polylactic acid-based resin becomes crystalline. It is preferred that the co-polymerization ratio of L-lactic acid is high because higher ratios facilitate crystallization. L/D is more preferably 97/3 or more, and most preferably 98/2 or more. L/D is 100/0 or less. Because optical isomers such as L and D have molecular structures that are mirror images of each other and physical properties are not different, enthalpy of fusion remains unchanged when the above-described L/D is substituted with D/L and consequently suitable resins include ones in which L/D is substituted with D/L.

Further, the polylactic acid-based resin may contain copolymerization ingredients other than lactic acid. The other copolymerization ingredient units can be, for example, a multivalent carboxylic acid, a polyhydric alcohol, a hydroxycarboxylic acid or a lactone. Exemplary multivalent carboxylic acids include oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, azelaic acid, sebacic acid, dodecanedioic acid, fumaric acid, cyclohexanedicarboxylic acid, terephthalic acid, isophthalic acid, phthalic acid, 2,6-naphthalenedicarboxylic acid, anthracene dicarboxylic acid, 5-sodium sulfoisophthalic acid and 5-tetrabutyl phosphonium sulfoisophthalic acid. Exemplary polyhydric alcohols include ethylene glycol, propylene glycol, butanediol, heptanediol, hexanediol, octanediol, nonanediol, decanediol, 1,4-cyclohexanedimethanol, neopentyl glycol, glycerin, pentaerythritol, bisphenol A, an aromatic polyhydric alcohol produced by an addition reaction of ethylene oxide to a bisphenol, diethylene glycol, triethylene glycol, polyethylene glycol, polypropylene glycol and polytetramethylene glycol. Exemplary hydroxycarboxylic acids include glycolic acid, 3-hydroxybutyric acid, 4-hydroxybutyric acid, 4-hydroxyvaleric acid, 6-hydroxycaproic acid and hydroxybenzoic acid. Exemplary lactones include glycolide, ϵ -caprolactone glycolide, ϵ -caprolactone, β -propiolactone, δ -butyrolactone, β -butyrolactone, γ -butyrolactone, pivalolactone and δ -valerolactone. The volume content of the other copolymerization units is preferably 30 mol % or less, more preferably 20

mol % or less, further more preferably 10 mol % or less, most preferably 5 mol % or less, relative to the total monomer units of the polylactic acid-based resin as 100 mol%.

Although molecular mass and molecular mass distribution of the polylactic acid-based resin are not limited in particular, the lower limit of weight average molecular mass of the polylactic acid-based resin is preferably 10,000 or more, more preferably 50,000 or more, further more preferably 100,000 or more, most preferably 200,000 or more. Further, although not limited in particular, the upper limit of weight average molecular mass is preferably 1,000,000 or less. The weight average molecular mass referred to herein is weight average molecular mass in terms of polymethyl methacrylate (PMMA), measured by gel permeation chromatography (GPC) using hexafluoroisopropanol as a solvent.

The PLA microparticles may have a number average particle diameter of 90 μm or less, preferably 50 μm or less, more preferably 30 μm or less. This improves smoothness. Further, in uses such as cosmetics, because coagulation of particles tends to occur when the number average particle diameter is too small, the lower limit of the number average particle diameter is generally 1 μm or more, preferably more than 1 μm , more preferably 2 μm or more, most preferably 3 μm or more.

The particle diameter distribution index is preferably 2 or less in order to improve flow of the particles and impart a smoother touch. The upper limit of the particle diameter distribution index is preferably 1.5 or less, more preferably 1.3 or less, most preferably 1.2 or less. Further, the lower limit is 1 in theory.

The above-described number average particle diameter of polylactic acid-based resin microparticles having porous shapes can be calculated by measuring diameters of 100 random particles in a scanning electron microscope image and computing the arithmetic average thereof. If a shape of a particle in the SEM image is not a perfect circle, for example, an ellipse, the maximum diameter of the particle is used as its diameter. To measure the particle diameter precisely, the measurement is carried out with a magnification of at least 1000 times or more, preferably with a magnification of 5000 times or more.

The particle diameter distribution index is calculated on the basis of the conversion equations described below, using measurements of the particle diameters obtained by measurement described above:

$$Dn = \sum_{i=1}^n Ri / n$$

$$Dv = \sum_{i=1}^n Ri^3 / \sum_{i=1}^n Ri^3$$

$$PDI = Dv / Dn$$

wherein Ri: particle diameter of single particle, n: the number of measurements (=100), Dn: number average particle diameter, Dv: volume average particle diameter, PDI: particle diameter distribution index.

5 Although the actual amount of pores in a porous microparticle of polylactic acid-based resin is difficult to measure directly, it is possible to use linseed oil absorption capacity as an indirect index, which is defined in pigment test methods such as Japan Industrial Standards (Refined Linseed Oil Method, JIS K 5101).

10 In particular, in the uses such as cosmetics and paints, higher linseed oil capability is preferable, and the lower limit of linseed oil capability is preferably 90 mL/100 g or more, more preferably 100 mL/100 g or more, further more preferably 120 mL/100 g or more, particularly preferably 150 mL/100 g or more, remarkably preferably 200 mL/100 g or more, most preferably 300 mL/100 g or more. The upper limit of linseed oil absorption capacity is preferably 1000 mL/100 g or less.

15 Further, it is preferred that the above-described porous microparticles of polylactic acid-based resin have enthalpy of fusion of 5 J/g or more. Higher enthalpy of fusion brings higher crystallization tendency and, as a result, heat resistance and durability tend to become high. The lower limit of enthalpy of fusion is preferably 10 J/g or more, more preferably 20 J/g or more, further more preferably 30 J/g or more.
20 Further, the upper limit is preferably 100 J/g or less. Enthalpy of fusion can be calculated from an area of peak showing thermal capacity of fusion at approximately 160°C in Differential Scanning calorimetry (DSC) in which a temperature is raised to 200°C with a temperature rise of 20°C per minute.

25 Sphericity of the above-described porous microparticles of polylactic acid-based resin is preferably 80 or more, more preferably 85 or more, furthermore preferably 90 or more, particularly preferably 92 or more, most preferably 95 or more. Further, in theory, the upper limit is 100. When sphericity is within the above-described range, it becomes possible to achieve an improvement in quality such as slidability. The sphericity is calculated by observing particles by a scanning electron microscope,

measuring both the longest diameters and the shortest diameters of 30 random particles and subsequently substituting the measurements into the equation described below:

$$S = \frac{\sum_{i=1}^n (D_s / D_L)}{n} \times 100$$

5 wherein S: Sphericity, n: the number of measurements (=30), D_s: the shortest diameter of single particle, D_L: the longest diameter of single particle.

MATTIFYING POWDER

The term "mattifying powder" means a powder which absorbs sebum and provides a mattifying effect to the skin.

10 Non-limiting examples of mattifying powders useful in the invention include, for example, modified starches, polyamide powders, hydrophobic silica aerogel particles, acrylic polymer powders, elastomeric silicone powders, clays, and mixtures thereof.

Modified starches useful in the invention include, for example, those known under the INCI names aluminum starch octenylsuccinate, sodium starch
15 octenylsuccinate, calcium starch octenylsuccinate, and mixtures thereof.

Polyamide powders useful in the invention include, for example, those known under the INCI name nylon-12, nylon-6, and mixtures thereof.

The term "hydrophobic silica" means any silica whose surface is treated with silylating agents, for example halogenated silanes such as alkylchlorosilanes,
20 siloxanes, in particular dimethylsiloxanes such as hexamethyldisiloxane, or silazanes, so as to functionalize the OH groups with silyl groups Si-R_n, for example trimethylsilyl groups.

Hydrophobic silica aerogel particles useful in the invention are preferably particles surface-modified with trimethylsilyl groups known under the INCI name silica
25 silylate and include, for example, the aerogel, the particles of which have a mean size of about 1000 microns and a specific surface area per unit of mass ranging from 600 to 800 m²/g. A hydrophobic silica aerogel particle is the aerogel, the particles of which have a mean size ranging from 5-15 microns and a specific surface area per unit of mass ranging from 600 to 800 m²/g.

30 Acrylic polymer powders useful in the invention include, for example, acrylic polymer powders such as methyl methacrylate crosspolymer.

Clays useful in the invention include, for example, clays of the smectite

family such as montmorillonites, hectorites, bentonites, beidellites and saponites, and also of the vermiculite, stevensite and chlorite families. Non-limiting examples of clays usefil in the invention include, for example, synthetic hectorites (also known as laponites), these products are sodium magnesium silicates and in particular sodium lithium magnesium silicates; bentonites, magnesium aluminium silicates, especially hydrated, or calcium silicates and especially the product in synthetic form.

Most preferably, the mattifying powders will be chosen from aluminum starch octenylsuccinate, nylon-12, silica silylate, methyl methacrylate crosspolymer, and mixtures thereof.

ADDITIONAL INGREDIENTS

In addition to the essential components described hereinbefore, the composition of the invention may further comprise any usual cosmetically acceptable ingredient, which may be chosen especially from such as additional sunscreens, perfume/fragrance, preserving agents, solvents, actives, surfactants, fatty compounds, vitamins, fillers, silicones, polymers, pigments and mixtures thereof.

A person skilled in the art will take care to select the optional additional ingredients and/or the amount thereof such that the advantageous properties of the composition according to the invention are not, or are not substantially, adversely affected by the envisaged addition.

Non-limiting example of preserving agent which can be used in accordance with the invention include phenoxyethanol.

Suitable fillers of the invention could be as examples of oil-absorbing fillers: mica, silica, zea may (corn) starch, magnesium oxide, nylon-12, nylon-66, cellulose, polyethylene, talc, talc (and) methicone, talc (and) dimethicone, perlite, sodium silicate, pumice, ptfe, polymethyl methacrylate, oryza sativa (rice) starch, aluminum starch octenylsuccinate, potato starch modified, alumina, silica silylate, calcium sodium borosilicate, magnesium carbonate, hydrated silica, dimethicone/vinyl dimethicone crosspolymer, sodium carboxymethyl starch.

Suitable solvents include, but are not limited to water, alcohols, glycols and polyols such as glycerin, caprylyl glycol, pentylene glycol, propylene glycol, butylene glycol, and mixtures thereof.

In various embodiments, the solvent is present in a concentration from about 15 to 00% by weight, or from about 20 to about 80% by weight, or from about 30 to about 70% by weight, or from about 35 to about 75% by weight, or preferably from

about 40 to about 70% by weight, and more preferably from about 45 to about 65% by weight, including ranges and sub-ranges there between, based on the total weight of the combinations and/or compositions of the present disclosure.

Suitable additional actives include, but are not limited to, disodium EDTA, triethanolamine, and mixtures thereof.

In addition to the emulsifying agents of the present disclosure, surfactants may also be used in the compositions of the present invention non-limiting examples of surfactants suitable for use are fatty acids, glyceryl esters in addition to glyceryl stearate, alkoxylated fatty alcohols, such as stearic acid, laureth-12, glyceryl isostearate, disodium stearyl glutamate, potassium cetyl phosphate, poloxamer 338, sodium methyl stearyl taurate and mixtures thereof.

Exemplary fat or oil materials include, but are not limited to, esters, fatty acids, synthetic oils, and hydrocarbons/paraffins, such as stearyl alcohol, myristic acid, palmitic acid. silicones mineral oil, plant/vegetable oils, and mixtures thereof.

Non-limiting example of vitamins suitable for the composition of the present invention includes tocopherol.

Also, non-limiting example of fatty compounds suitable for the present invention include diisopropyl sebacate, isononyl isononanoate and stearyl alcohol.

Exemplary of polymers, include, but not limited to, ammonium acryloyldimethyltaurate/vp copolymer and acrylates/C₁₀₋₃₀ alkyl acrylate crosspolymer.

The additional ingredients may represent from 60% to 85%, such as from 60% to 82% or such as from 65 to 80% by weight of the total weight of the composition.

By way of non-limiting illustration, the invention will now be described with reference to the following examples.

EXAMPLES

Examples 1 to 4

A suitable composition of the invention is as Examples 1 to 3 and Example 4 is considered the closest prior art, as follows:

FUNCTION	INGREDIENT	Ex. 1(%) (invention)	EX. 2 (%) (invention)	EX. 3 (%) (invention)	EX. 4 (%) (prior art)
ACTIVE COMPOUND	DISODIUM EDTA	0.1	0.1	0.1	0.1
ACTIVE COMPOUND	TRIETHANOLA MINE	2.459	1.5	2.0	1.12

FUNCTION	INGREDIENT	Ex. 1(%) (invention)	EX. 2 (%) (invention)	EX. 3 (%) (invention)	EX. 4 (%) (prior art)
ACTIVE COMPOUND	TROMETHAMINE	-	-	-	1.8125
FATTY COMPOUND	ISONONYL ISONONANOATE	7.0	4.0	5.5	7.0
FATTY COMPOUND	STEARYL ALCOHOL	0.28	10	7	0.28
FILLER	SILICA	5.1	8	6.5	5.1
POLYMER	ALUMINUM STARCH OCTENYLSUCCINATE	2	1	1.5	2
POLYMER	ACRYLATES/C ₁₀₋₃₀ ALKYL ACRYLATE CROSSPOLYMER	0.751	1.5	2	0.751
POLYMERIC FILLER	POLYLACTIC ACID	1	1.5	2	1
PRESERVATIVE	PHENOXYETHANOL	0.7	0.7	0.7	0.5
SILICON	CAPRYLYL METHICONE	2	2	2	2
SOLVENT	WATER	qs	qs	qs	qs
SOLVENT	GLYCERIN	2	2	2	2
SOLVENT	PENTYLENE GLYCOL	2.4	2.5	3	2.3
SUN FILTER	PHENYLBENZIMIDAZOLE SULFONIC ACID	5.9	5	3	5.9

FUNCTION	INGREDIENT	Ex. 1(%) (invention)	EX. 2 (%) (invention)	EX. 3 (%) (invention)	EX. 4 (%) (prior art)
SUN FILTER	TEREPHTHALYLIDENE DICAMPHORSULFONIC ACID	6.03	5	7.5	6.03
SUN FILTER	OCTOCRYLENE	5.3	6.5	7	5.3
SUN FILTER	BIS-ETHYLHEXYLOXYPHENOL METHOXYPHENYL TRIAZINE	5.0	8.5	5	5.0
SUN FILTER	SILICA (and) TITANIUM DIOXIDE	6.5	8	5	6.5
SUN FILTER	METHYLENE BIS-BENZOTRIAZOLYL TETRAMETHYLBUTYLPHENOL (and) POLYGLYCERYL-10 LAURATE	7.0	7	7.5	7.0
SURFACTANT	STEARIC ACID	1.05	8	10	1.05
SURFACTANT	GLYCERYL STEARATE (and) PEG-100 STEARATE	0.91	6	9	0.91

FUNCTION	INGREDIENT	Ex. 1(%) (invention)	EX. 2 (%) (invention)	EX. 3 (%) (invention)	EX. 4 (%) (prior art)
SURFACTANT	POTASSIUM CETYL PHOSPHATE	0.7	5	7	0.7
SURFACTANT	POLOXAMER 338	0.21	0.5	0.3	0.21
SURFACTANT	SODIUM METHYL STEAROYL TAURATE	0.35	5	7	-
VITAMIN	TOCOPHEROL	0.3	0.35	0.2	0.3

A stability test was performed with the compositions of Ex. 1 (comprising the surfactant system) and Ex. 2 (without the surfactant system) during 2 months. The compositions were evaluated at a room temperature and at 45°C.

Based on the comparison of such compositions, it was possible to observe a superior stability and robustness of the composition of the present invention (comprising the surfactant system) in view of the composition of the state of the art (without the surfactant system), as showed by FIG. 1.

Example 5

A non-limiting example regarding the preparation of the composition of Example 1, could be as follows:

Step (A): The aqueous phase comprising water, preservatives and surfactants is mixed at a room temperature until achieve a solution;

Step (B): The thickening polymers are added to the aqueous phase by mixing well;

Step (C): Subsequently, the polymer is neutralized;

Step (D): The oily phase comprising the PLA, UV filter system and mattifying powder is heated up to 75°C mixing well;

Step (E): The emulsion is achieved by the addition of oily phase on the neutralized aqueous phase with a cold bath, and

Step (F): Adding the fillers to the emulsion of Step (E) by mixing well.

SET OF CLAIMS

1. A surfactant system comprising:

(i) from about 1 to about 30% by weight of a mixture of at least three stearyl derivatives compounds;

5 (ii) from about 0.05 to about 10% by weight of a phosphate surfactant;

(iii) from about 0.05 to 10% by weight of sodium salt of the stearic acid amide.

2. Surfactant system, according to the proceeding claim, wherein the mixture of at least three stearyl derivatives compounds comprises stearic acid, glyceryl stearate and PEG-100 stearate and stearyl alcohol.

3. Surfactant system, according to any one of the proceeding claims, wherein the mixture of at least three stearyl derivatives compounds is ranging from about 2.5 to about 8% by weight, or more preferably from about 3 to about 6% by weight, including all ranges and sub-ranges there between, relative to the total weight of the composition.

4. Surfactant system, according to any one of the proceeding claims, wherein the mixture of at least three stearyl derivatives compounds employs a first surfactant in an amount preferably ranging from about 0.1 to about 10% by weight and preferably from about 0.3 to about 5% by weight, or more preferably from about 0.5 to about 3% by weight, including all ranges and sub-ranges there between, relative to the total weight of the composition.

5. Surfactant system, according to any one of the proceeding claims, wherein the mixture of at least three stearyl derivatives compounds employs a second surfactant in an amount preferably ranging from about 0.05 to about 10% by weight and preferably from about 0.1 to about 6% by weight, or more preferably from about 0.2 to about 3% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

6. Surfactant system, according to any one of the proceeding claims, wherein the mixture of at least three stearyl derivatives compounds employs a third surfactant in an amount preferably ranging from about 0.05 to about 10% by weight and preferably from about 0.1 to about 5% by weight, or more preferably from about 0.1 to about 2% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

7. Surfactant system, according to any one of the proceeding claims, wherein the phosphate surfactant is selected from the group comprising monoalkyl phosphates, potassium cetyl phosphate, dialkyl phosphates, salts of monoalkyl phosphates, salts of dialkyl phosphates, and mixtures thereof.

5 8. Surfactant system, according to any one of the proceeding claims, wherein the phosphate surfactant is present in the surfactant system in a range of from about 0.1 to about 5% by weight, or more preferably from about 0.2 to about 3% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

10 9. Surfactant system, according to any one of the proceeding claims, wherein the sodium salt of the stearic acid amide is selected from sodium methyl stearoyl taurate.

10 10. Surfactant system, according to any one of the proceeding claims, wherein the sodium salt of the stearic acid amide is present in the composition in a range of from about 0.1 to about 4% by weight, or more preferably from about 0.2 to about 1% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

11. A sunscreen composition comprising:

(a) a surfactant system, as defined in any one of the proceeding claims;

20 (b) UV filters;

(c) a polylactic acid-based resin (PLA); and

(d) a mattifying powder.

25 12. Sunscreen composition, according to the preceding claim, wherein the surfactant system in the sunscreen composition of the invention ranges from about 0.2 to about 8% by weight, or from about 0.3 to about 7% by weight, from about 0.5 to about 5% by weight or from about 0.6 to about 4.5% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

30 13. Sunscreen composition, according to any one of claims 10 to 11, wherein the UV filters are selected from oil-soluble organic ingredient, water-soluble organic sunscreen ingredient and silica-coated titanium dioxide sunscreen ingredient.

14. Sunscreen composition, according to any one of claims 10 to 12, wherein the UV filters in the sunscreen composition of the invention ranges from about 3% to about 40% by weight, preferably in an amount of from about 5% to about 25%

by weight, and most preferably about 7% to about 18% by weight, based on the total weight of the composition.

15. Sunscreen composition, according to any one of claims 10 to 13, wherein the polylactic acid-based resin (PLA) in the sunscreen composition of the invention ranges from about 0.1 to about 3% by weight, or from about 0.2 to about 2% by weight, or from about 0.1 to about 1% by weight, including all ranges and sub-ranges therebetween, relative to the total weight of the composition.

16. Sunscreen composition, according to any one of claims 10 to 14, wherein the mattifying powder is selected from modified starches, polyamide powders, hydrophobic silica aerogel particles, acrylic polymer powders, elastomeric silicone powders, clays, and mixtures thereof.

17. Sunscreen composition, according to any one of claims 10 to 15, wherein the amount of the mattifying agent in the sunscreen composition of the invention ranges from about 0.01% to about 10% by weight, preferably in an amount of from about 0.1% to about 5% by weight, and most preferably about 0.5% to about 4% by weight, based on the total weight of the composition.

18. Sunscreen composition, according to any one of claims 10 to 16, wherein it further comprises cosmetically acceptable ingredients selected from additional sunscreens, perfume/fragrance, preserving agents, solvents, actives, surfactants, fatty compounds, vitamins, polymers, fillers, silicones and mixtures thereof.

19. Sunscreen composition, according to any one of claims 10 to 17, wherein it presents a Sun Protection Factor 50.

20. Sunscreen composition, according to any one of claims 10 to 18, wherein it presents a Sun Protection Factor 60.

21. Sunscreen composition, according to any one of claims 10 to 19, wherein it presents a Sun Protection Factor 70.

22. Sunscreen composition, according to any one of claims 10 to 20, wherein it presents a Sun Protection Factor 80.

23. Sunscreen composition, according to any one of claims 10 to 21, wherein it is in the form of an O/W emulsion.

24. Sunscreen composition, according to any one of claims 10 to 22, wherein the pH is within the range of about 6.0 to about 7.6, more preferably, of about 6.5.

25. Use of a surfactant system, as defined in any one of claims 1 to 9, wherein it is for the manufacture of a sunscreen composition.

26. Use of a sunscreen composition, as defined in any one of claims 10 to 23, wherein it is for the manufacture of a product to be used as sunscreen daily product.

27. Use, according to claim 26, wherein it is for the manufacture of a product with presents a high level of UV-protection in order to protect the keratin fibers from the damages of the sun, easy application, good spreadability and less silicon effect, less white film, less shine, which does not run on high temperature in the face, has an imperceptible touch, gives the ideal balance between hydration and oil control, reduces impurities accumulation, reinforces the barrier against pollution, leaves the facial skin breathing, combines high protection with smoothness to the skin, sweat resistant, prepare the skin for the make-up, renew the skin quality, let the skin breathe, purified skin sensation and soothing effect to the skin and is stable over the time.

28. Use, according to one of claims 26 to 27, wherein the composition is in the form of an O/W emulsion.

29. A process of manufacturing the sunscreen composition, as defined in any one of claims 10 to 24, comprising the following steps:

Step (A): The aqueous phase comprising water, preservatives and surfactants is mixed at a room temperature until achieve a solution;

Step (B): The thickening polymers are added to the aqueous phase by mixing well;

Step (C): Subsequently, the polymer is neutralized;

Step (D): The oily phase comprising the PLA, UV filter system and mattifying powder is heated up to 75°C mixing well;

Step (E): The emulsion is achieved by the addition of oily phase on the neutralized aqueous phase with a cold bath, and

Step (F): Adding the fillers to the emulsion of Step (E) by mixing well.

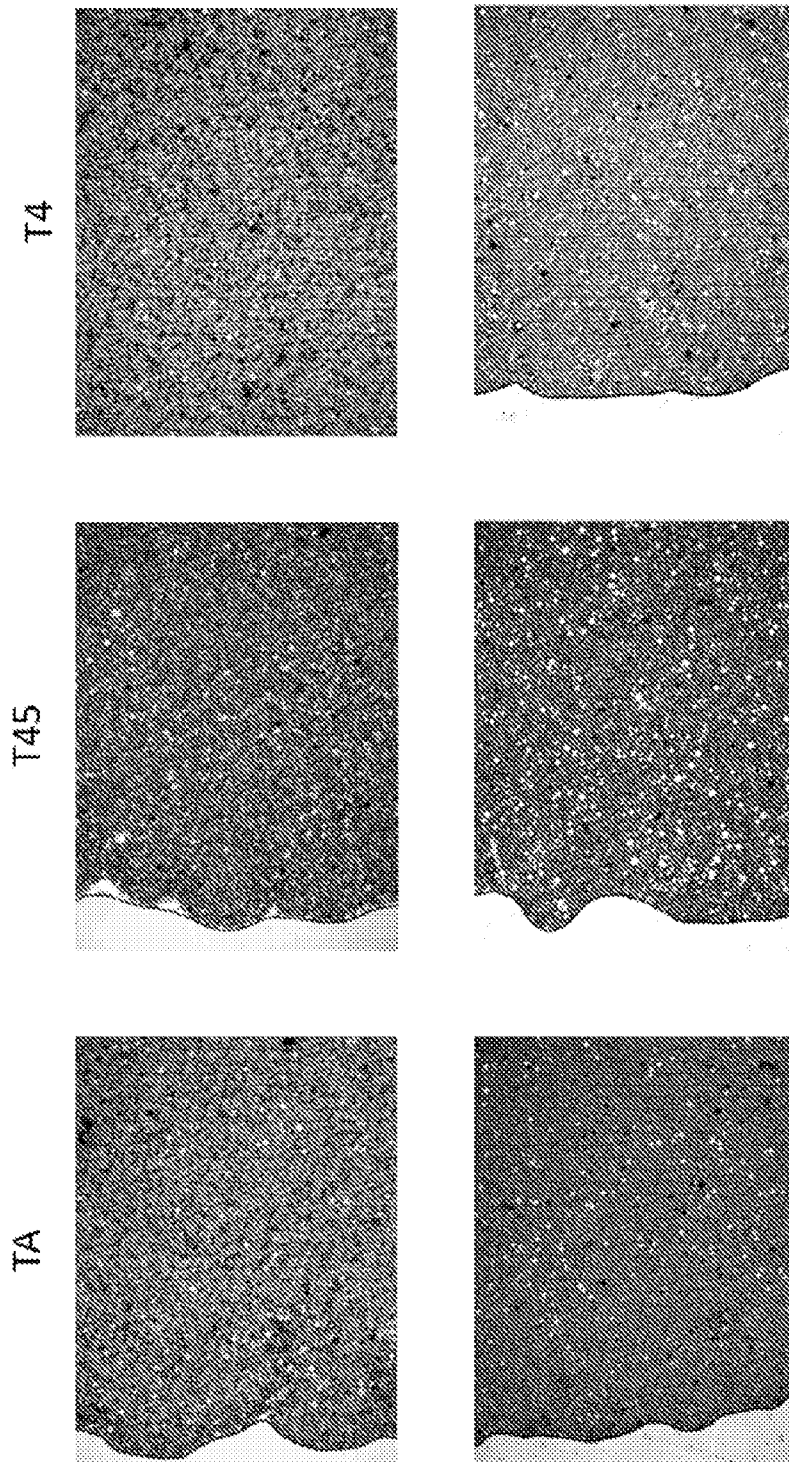


FIG. 1

INTERNATIONAL SEARCH REPORT

International application No
PCT/BR2018/050212

A. CLASSIFICATION OF SUBJECT MATTER		
INV.	A61K8/42 A61Q17/04	A61K8/36 A61K8/46
	A61K8/37 A61K8/06	A61K8/55 A61K8/86
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, CHEM ABS Data, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2017/029807 A1 (OREAL [FR]; HARADA YASUKO [JP]; KOIKE TORU [JP]; AMAZAKI KYOKO [JP]) 23 February 2017 (2017-02-23)	1,3-8, 10,25-28
Y	page 17, paragraph 106; table 3	1-29
Y	----- JP 2013 071920 A (KOSE CORP) 22 April 2013 (2013-04-22) paragraph [0079] - paragraph [0083]	1-29
Y	----- EP 3 315 116 A1 (CYBERDERM LABORATORIES INC [CA]) 2 May 2018 (2018-05-02) paragraph [0080] - paragraph [0087]	11-29
	----- -/-	
☒ 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 "E" earlier application or patent but published on or after the international filing date "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) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "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 "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 "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 "&" document member of the same patent family		
Date of the actual completion of the international search 9 October 2018		Date of mailing of the international search report 22/10/2018
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 Bader, Karl Günther

INTERNATIONAL SEARCH REPORT

International application No

PCT/BR2018/050212

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE GNPD [Online] MINTEL; 7 March 2018 (2018-03-07), anonymous: "Hydration Body Sunscreen SPF 70", XP055513286, retrieved from www.gnpd.com Database accession no. 5496659 abstract -----	1-29

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Information on patent family members

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