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(54) Title: SUNSCREEN COMPOSITION, USE OF THE SUNSCREEN COMPOSITION AND PROCESS OF MANUFACTURING THE SUNSCREEN COMPOSITION

(57) Abstract: The present invention is directed to new sunscreen compositions comprising (a) a stabilizing surfactant system comprising at least one anionic surfactant and at least one nonionic surfactant; (b) organic UV filters; and (c) uncoated pigments. The composition of the present invention is stable over the time, also presents a high level of UV-protection in order to protect the skin from the damages of the sun, easy application, good spreadability, less shine, which does not melt on high temperature on the face, uniformization of the skin's tone, has an imperceptible and dry touch and combines high protection with smoothness to the skin.



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SUNSCREEN COMPOSITION, USE OF THE SUNSCREEN COMPOSITION AND PROCESS OF MANUFACTURING THE SUNSCREEN COMPOSITION

FIELD OF THE INVENTION

The present invention is directed to new sunscreen compositions with high SPF and dry touch sensorial to the skin, uses of said sunscreen composition and a process of manufacturing the sunscreen compositions.

BACKGROUND OF THE INVENTION

The photoprotection of keratinous materials, including both skin and hair, is considered of great importance in order to protect from sun-damage, sunburn, photo-aging, as well as to decrease the chances of skin cancer development caused by exposure to ultraviolet ("UV") radiation. There are typically two types of UVA/UVB sunscreen compositions used to accomplish photoprotection, namely, inorganic UV filters and organic UV filters.

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).

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, 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.

Additionally, an important problem of sunscreen compositions is that, due to the great amount of sunscreen filters associated with great amount of pigments and further additional ingredients to ensure the good sensoriality in the O/W emulsion, it tends to be unstable.

The pigments are essential raw materials for delivering an additional attribute to the sunscreen composition, which is the uniformization of the skin tone and, consequently the appearance of the skin. However, such association of pigments to a sunscreen composition results in a high complexity challenge to stabilize the emulsion.

The challenge of formulating a sunscreen composition having high amounts of UV filters, pigments and further additional ingredients associated with the unique sensorial described above is that such composition tends to be unstable and ineffective.

Therefore, a stable sunscreen composition is desired, associated with easy application, good spreadability, less shine, which does not melt at high temperature on the face, has an imperceptible and dry touch, high SPF values, gives the ideal balance between hydration and oil control, uniformization of the skin's tone and combines high protection with smoothness to the skin.

Thus, the inventors succeeded to overcome the problems of the state of the art and surprisingly revealed a stable sunscreen composition, even at high concentrations of pigments and organic UV filters, having a light feel and pleasant sensorial through a specific stabilizing surfactant system comprising at least one anionic surfactant and at least one non-ionic surfactant, organic UV filters and pigments.

SUMMARY OF THE INVENTION

The present invention is directed to new sunscreen compositions comprising (a) a stabilizing surfactant system comprising at least one anionic surfactant and at least one nonionic surfactant, (b) organic UV filters and (c) uncoated pigments.

The composition of the present invention is stable over the time, also presents a high level of UV-protection in order to protect the skin from the damages of the sun, easy application, good spreadability, less shine, which does not melt on high temperature on the face, uniformization of the skin's tone, has an imperceptible and dry touch and combines high protection with smoothness to the skin.

BRIEF DESCRIPTION OF THE DRAWINGS

Figures 1a and 1b show the result of the centrifuge test for a composition according to Example 1 of the present invention.

Figures 2a and 2b show the result of the centrifuge test for a composition according to Example 2 of the present invention.

Figures 3a and 3b show the result of the centrifuge test for a composition according to Example 3 of the present invention.

Figures 4a and 4b show the result of the centrifuge test for a composition according to Example 4 of the present invention.

Figure 5 shows the result of the package temperature test for a composition according to Example 1 of the present invention.

Figure 6 shows the result of the package temperature test for a composition according to Example 2 of the present invention.

5 Figure 7 shows the result of the package temperature test for a composition according to Example 3 of the present invention.

Figure 8 shows the result of the package temperature test for a composition according to Example 4 of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

10 In an embodiment, the sunscreen composition of the present invention comprises:

(a) a stabilizing surfactant system comprising at least one anionic surfactant and at least one nonionic surfactant;

(b) organic UV filters; and

15 (c) uncoated pigments.

The composition according to the invention, presents a dry touch sensorial performance, as well as a strong and robust stability of the composition over the time, even at high concentrations of pigments and organic UV filters.

20 In a preferred embodiment, the amount of stabilizing surfactant system in the composition of the present invention is ranging from about 1% to 10% by weight and preferably from about 1.5% to about 8% by weight, more preferably from about 1.5% to about 6% by weight, including all ranges and sub-ranges there between, based on the total weight of the composition.

25 The stabilizing surfactant system of the present invention comprises at least one anionic surfactant in an amount ranging from about 0.1% to about 8% by weight and preferably from about 0.1% to about 5% by weight, more preferably from about 0.1% to about 3% by weight, including all ranges and sub-ranges there between, based on the total weight of the composition.

30 In a preferred embodiment, the anionic surfactants of the present invention are select from disodium ethylene dicocamide PEG-15 disulfate, glyceryl stearate citrate and mixtures thereof.

In a preferred embodiment, the stabilizing surfactant system of the present invention comprises at least one non-ionic surfactant in an amount ranging from about 0.1% to about 9.5% by weight, preferably from 0.5% to about 7% by weight,

more preferably from about 1% to about 5% by weight, including all ranges and sub-ranges there between, based on the total weight of the composition.

In a preferred embodiment, the non-ionic surfactants of the present invention are select from polyglyceryl-3 dicitrate/stearate, polyglyceryl-3 methylglucose distearate, arachidyl alcohol, behenyl alcohol, arachidyl glucoside, ceteareth-25, and mixtures thereof.

The amount of organic UV filters in the sunscreen composition of the invention preferably ranges from about 3% to about 50% by weight, preferably in an amount of from about 5% to about 40% by weight, more preferably about 7% to about 30% by weight, most preferably about 10% to about 25% by weight, based on the total weight of the composition.

In a preferred embodiment, the UV filters of the present invention are select from the group consisting of butyl methoxydibenzoylmethane, ethylhexyl salicylate, ethylhexyl triazone, octocrylene, homosalate and mixtures thereof.

The amount of the uncoated pigments in the sunscreen composition of the invention preferably ranges from about 0.1% to about 20% by weight, more preferably from about 0.5% to about 10% by weight, and most preferably from about 1% to about 10% by weight, based on the total weight of the composition.

In a preferred embodiment, the uncoated pigments of the present invention are select from the group of metal oxide pigments, such as titanium dioxide, zinc oxide, titanium oxide, iron oxide, zirconium oxide and cerium oxide, or mixtures thereof.

The sunscreen composition of the invention is in the form of an oil in water (O/W) emulsion and can be used as a daily product for the skin.

The pH of the sunscreen composition according to the present invention is generally between 4 and 6.

In another preferred embodiment, the composition of the present invention presents a SPF of 30, 50, 60, 70 or 90.

Therefore, 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, less shine, which does not melt on high temperature in the face, has an imperceptible and dry touch and combines high protection with smoothness to the skin. Also, the composition of the present invention is stable over the time and presents enhanced emulsion stability.

In another preferred embodiment, the present invention is related to the use of a composition for manufacturing a product for preventing sunburn, which can be used as sunscreen daily product.

5 The present invention is also related to a process of manufacturing a sunscreen composition that provides the consumer with the properties described above.

The process of manufacturing the sunscreen composition of the present invention comprises the following steps:

10 (a) preparing an oily phase by mixing the organic UV filters, the uncoated pigments and the stabilizing surfactant system, wherein the oily phase is heated until complete homogenization; and

(b) adding an aqueous phase to the oily phase of step (a) under mixing until complete formation of the emulsion.

15 In a particular embodiment, the aqueous phase of step (b) is prepared by mixing water and at least one additional ingredient.

In another particular embodiment, the step (a) of the process of the present invention further comprises the mixing of at least one additional ingredient.

20 Preferably, the least one additional ingredient of steps (a) and (b) is selected from the group consisting of inorganic UV filters, coated pigments, perfume/fragrance, preserving agents, solvents, actives, fatty compounds, vitamins, fillers, silicones and polymers.

TERMS

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

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

30 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. 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.

STABILIZING SURFACTANT SYSTEM

The stabilizing surfactant system of the present invention comprises at least one anionic surfactant and at least one non-ionic surfactant.

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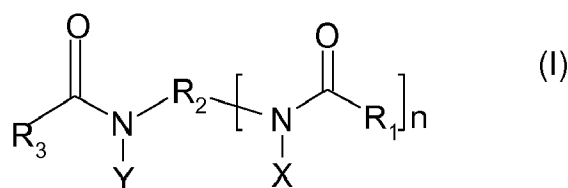
Anionic Surfactants

Anionic surfactants mean a surfactant comprising, as ionic or ionizable groups, only anionic groups. These anionic groups are chosen preferably from the groups CO_2H , CO_2^- , SO_3H , SO_3^- , OSO_3H , OSO_3^- , $\text{O}_2\text{PO}_2\text{H}$, O_2PO_2^- and $\text{O}_2\text{PO}_2^{2-}$.

Non-limiting anionic surfactant(s) that may be used in the present invention are selected from the group comprising alkyl sulfates, alkyl ether sulfates, alkylamido ether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, sulfonates, such as alkylsulfonates, alkylamide sulfonates, alkylarylsulfonates, alpha-olefin sulfonates, paraffin sulfonates, sulfosuccinates, alkylsulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl sulfoacetates, acylsarcosinates, acylglutamates, alkylsulfosuccinamates, taurates and N-acyl N-methyltaurates, isethionates, N-acylisethionates, N-acyltaurates, phosphates and alkyl phosphates, salts of alkyl monoesters and polyglycoside-polycarboxylic acids, acyllactylates, mixed esters of organic acids with glycerol, such as glyceryl stearate citrate and as glyceryl stearate lactate, salts of D-galactoside uronic acids, salts of alkyl ether carboxylic acids, salts of alkyl aryl ether carboxylic acids, and salts of alkylamido ether carboxylic acids; or the non-salified forms of all of these compounds, the alkyl and acyl groups of all of these compounds containing from 6 to 24 carbon atoms and the aryl group denoting a phenyl group. Some of these compounds may be oxyethylenated and then preferably comprise from 1 to 50 ethylene oxide units.

25

Further examples of anionic surfactants also comprise the dimeric surfactant of formula (I), described in WO 96/14926:



30

in which:

R_1 and R_3 denote, independently of each other, an alkyl radical containing from 1 to 25 carbon atoms;

R_2 denotes a spacer consisting of a linear or branched alkylene chain

containing from 1 to 12 carbon atoms;

X denotes a group $-(C_2H_4O)_a-(C_3H_6O)_bZ$;

Y denotes a group $-(C_2H_4O)_c-(C_3H_6O)_dZ$;

in which

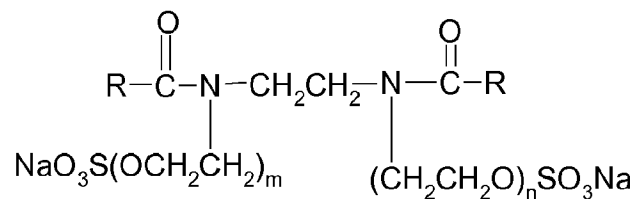
Z denotes a hydrogen atom or a radical $-CH_2-COOM$, $-SO_3M$, $-P(O)(OM)_2$, $-C_2H_4SO_3M$, or $-C_3H_5SO_3M$ group, in which M & M' represent H or an alkali metal or alkaline-earth metal or ammonium or alkanolammonium ion,

a and c, independently of each other, range from 0 to 15,

b and d, independently of each other, range from 0 to 10, and

the sum of $a + b + c + d$ ranges from 1 to 25; and n ranges from 1 to 10.

A surfactant of this type is, particularly, the one identified by the INCI name: Disodium ethylene dicocamide PEG-15 disulfate, having the following structure:



wherein RCO represents a coconut fatty acid radical and $m + n$ has a mean value of 15.

In a preferred embodiment, the anionic surfactants of the present invention are select from disodium ethylene dicocamide PEG-15 disulfate, glyceryl stearate citrate and mixtures thereof.

Non-Ionic Surfactants

Non-limiting examples of non-ionic surfactants useful in the present invention include, for example, alkyl- and polyalkyl- esters of glycerol, such as polyglyceryl-3 dicitrate/stearate, mixtures of alkyl- and polyalkyl- esters of glycerol with polyglyceryl, such as polyglyceryl-3 methylglucose distearate, 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 alcohols, fatty alcohol ethers of sugars, especially alkyl polyglucosides (APGs) such as decyl glucoside, 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.

5 In a preferred embodiment, the non-ionic surfactants of the present invention are select from polyglyceryl-3 dicitrate/stearate, polyglyceryl-3 methylglucose distearate, arachidyl alcohol, behenyl alcohol, arachidyl glucoside, cetareth-25, and mixtures thereof.

ORGANIC UV FILTERS

10 The organic UV filters used in the composition of the present invention are selected from the group consisting of oil-soluble organic sunscreen ingredients and water-soluble organic sunscreen ingredients. Non-limiting suitable organic UV filters of the present invention could be as follows:

Oil-soluble organic sunscreen ingredient

15 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
20 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
25 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
30 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 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:

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:

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.

Beta, beta -Diphenylacrylate derivatives:

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

Benzophenone derivatives:

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:

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.

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.

5 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, 10 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 15 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 20 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, 25 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.

UNCOATED PIGMENTS

30 The suitable pigments used in the sunscreen composition of the present invention are uncoated pigments.

In a preferred embodiment, the uncoated pigments used in the sunscreen composition of the present invention are selected from the group consisting

of metal oxide pigments, such as titanium dioxide, zinc oxide, titanium oxide, iron oxide, zirconium oxide and cerium oxide, or mixtures thereof.

ADDITIONAL INGREDIENTS

5 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 inorganic UV filters, coated pigments, perfume/fragrance, preserving agents, solvents, actives, fatty compounds, vitamins, fillers, silicones, polymers, and mixtures thereof.

10 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.

15 Suitable coated pigments are more particularly titanium oxides coated with silica such as the product, silica and iron oxide, silica and alumina, alumina such as the products, alumina and aluminum stearate, alumina and aluminum laurate, iron oxide and iron stearate, zinc oxide and zinc stearate, silica, alumina and silicone, silica, alumina, aluminum stearate and silicone, alumina and silicone, etc.

20 Mixtures of metal oxides may also be mentioned, especially titanium dioxide and cerium dioxide, including the silica-coated equiponderous mixture of titanium dioxide and cerium dioxide, as well as the alumina-silica- and silicone-coated mixture of titanium oxide and zinc dioxide, or the alumina-, silica- and glycerin-coated mixture of titanium dioxide and zinc dioxide.

25 Suitable polymers include, but are not limited to, aluminum starch octenylsuccinate, xanthan gum, poly C₁₀₋₃₀ alkyl acrylate, acrylates/C₁₀₋₃₀ alkyl acrylate crosspolymer, styrene/acrylates copolymer, and mixtures thereof.

The composition may also comprise at least one silicon ingredient, which may be dimethicone and caprylyl methicone, among others.

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

30 Suitable fillers of the invention could be as examples of oil-absorbing fillers: mica, silica, zeamay (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, water, caprylyl glycol, pentylene glycol, propylene glycol, butylene glycol, C₁₂₋₁₅ alkyl benzoate and mixtures thereof.

In various embodiments, the solvent is present in a concentration from about 15 to 100% by weight, or from about 20 to about 85% by weight, or from about 30 to about 75% by weight, or from about 35 to about 75% by weight, or preferably from about 40 to about 75% by weight, and more preferably from about 45 to about 75% 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.

Exemplary of 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.

Examples of silicones used in the composition of the present invention but not limited to are dimethicone and caprylyl methicone.

Exemplary of polymers, include, but not limited to, aluminum starch octenylsuccinate, xanthan gum, acrylates/C₁₀₋₃₀ alkyl acrylate crosspolymer and styrene/acrylates copolymer.

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

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

EXAMPLES

EXAMPLES 1 TO 4

Suitable compositions according to the present invention are as Examples 1 to 4, as follows:

FUNCTION	INGREDIENT	EX. 1 (%)	EX. 2 (%)	EX. 3 (%)	EX. 4 (%)
pigments	titanium dioxide	5.5	6	3	6

FUNCTION	INGREDIENT	EX. 1 (%)	EX. 2 (%)	EX. 3 (%)	EX. 4 (%)
	iron oxides	0.22	0.11	0.39	0.83
	iron oxides	1.14	1.34	1.22	0.88
	iron oxides	0.053	0.101	0.078	0.043
UV filter	homosalate	2.5	5	4	7
	ethylhexyl salicylate	3	2.5	1.5	1
	octocrylene	1	3	2	5
	butyl methoxydibenzoyl methane	7	4	5	6
	ethylhexyl triazone	4.5	3	8	4.5
surfactant	polyglyceryl-3 dicitrate/stearate	0.30	0.83	1.44	-
	glyceryl stearate citrate	0.42	1.15	-	1.23
	arachidyl glucoside	0.183	-	0.83	-
	arachidyl alcohol	0.27	-	0.39	-
	behenyl alcohol	0.09	-	0.68	-
	ceteareth-25	0.50	0.98	0.75	1.93
	polyglyceryl-3 methylglucose distearate	0.60	-	-	0.83
additional compounds	disodium ethylene dicocamide peg-15 disulfate	0.31	0.42	0.95	0.43
	xanthan gum	1.2	0.4	0.95	0.35
	phenoxyethanol	0.6	1.1	0.55	0.9
	C ₁₂₋₁₅ alkyl benzoate	18.4	21.8	20.3	20.2
water	caprylyl glycol	0.5	0.2	0.3	0.4
	water	Q.S.	Q.S.	Q.S.	Q.S.

EXAMPLES 5 TO 11

Comparative compositions are as Examples 5 to 11, as follows:

FUNCTION	INGREDIENT	EX. 5 (%)	EX. 6 (%)	EX. 7 (%)	EX. 8 (%)	EX. 9 (%)	EX. 10 (%)	EX. 11 (%)
pigment	iron oxides	9	9	9	9	9	9	9
UV filter	homosalate	5	5	5	5	5	5	5
	ethylhexyl salicylate	3	3	3	3	3	3	3
	octocrylene	4	4	4	4	4	4	4
	butyl methoxydibenzoyl methane	6	6	6	6	6	6	6

FUNCTION	INGREDIENT	EX. 5 (%)	EX. 6 (%)	EX. 7 (%)	EX. 8 (%)	EX. 9 (%)	EX. 10 (%)	EX. 11 (%)
	ethylhexyl triazone	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	terephthalylidene dicamphor sulfonic acid	0.3	0.3	0.3	0.3	0.3	0.3	0.3
surfactant	peg-90	4	-	-	-	-	-	-
	sucrose laurate	-	4	-	-	-	-	-
	potassium cetyl phosphate	-	-	-	-	-	-	4
	sodium lauroyl glutamate	-	-	-	4	-	-	-
	sodium cocoyl glutamate	-	-	-	-	0.5	-	-
	disodium cocoyl glutamate	-	-	-	-	1.06	-	-
	sodium dilauramidoglutamide lysine	-	-	-	-	-	1.4	-
additional ingredients	butylene glycol	-	-	-	-	-	0,5	-
	xanthan gum	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	caprylyl glycol	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	phenoxyethanol	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	acrylates/c10-30 alkyl acrylate crosspolymer	-	-	5	-	-	-	-
	C ₁₂₋₁₅ alkyl benzoate	7	7	7	7	7	7	7
water	water	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.

EXAMPLE 12

The compositions according to examples 1 to 4 were prepared according to the following steps:

5 Step (a): Prepare an oily phase by mixing the UV filters, the pigments, the surfactants, C₁₂₋₁₅ alkyl benzoate and xanthan gum until total homogenization;

 Step (b): Prepare an aqueous phase by mixing the water, caprylyl glycol and phenoxyethanol;

10 Step (c): Add the aqueous phase of step (b) to the oily phase of step (a) under mixing until complete formation of the emulsion.

EXAMPLE 13

In order to demonstrate the emulsion stability of the composition according to the present invention, two different stability tests were performed.

Test 1 – Centrifuge Test

5 The first test was a centrifugation of the compositions according to examples 1 to 4, with temperature variation to predict phase separation, in both low and high centrifugation speeds (between 500 and 5000 rpm). After centrifugation, the stability of the compositions is both visually and analytically evaluated.

10 The results of the centrifugation tests are shown in Figures 1 to 4, respectively, for examples 1 to 4, wherein “a” indicates the result of the visual evaluation and “b” the analytical data of the stability index along time. It is possible to observe that the sunscreen compositions according to the present invention did not shown phase separation in the visual evaluation and exhibited low instability indexes during centrifugation.

Test 2 – Package Temperature Test

15 The second test was performed with packaged sunscreen compositions of examples 1 to 4, wherein the stability of the emulsion was visually evaluated after the packages were submit to temperature variations between 4°C and 60°C. The results of the package temperature tests are shown in Figures 5 to 8, respectively, for examples 1 to 4. It is possible to observe that, even at high temperatures, the
20 compositions according to the present invention did not shown phase separation.

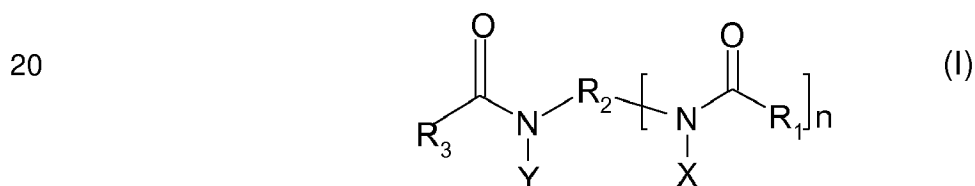
SET OF CLAIMS

1. A sunscreen composition comprising:

(a) a stabilizing surfactant system comprising:

(i) at least one anionic surfactant selected from the group consisting

5 of: alkyl sulfates, alkyl ether sulfates, alkylamido ether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, sulfonates, such as alkylsulfonates, alkylamide sulfonates, alkylarylsulfonates, alpha-olefin sulfonates, paraffin sulfonates, sulfosuccinates, alkylsulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl sulfoacetates, acylsarcosinates, acylglutamates, 10 alkylsulfosuccinamates, taurates, N-methyltaurates and N-acyltaurates, isethionates, N-acylisethionates, phosphates and alkyl phosphates, salts of alkyl monoesters and polyglycoside-polycarboxylic acids, acyllactylates, mixed esters of organic acids with glycerol, such as glyceryl stearate citrate and glyceryl stearate lactate, salts of D-galactoside uronic acids, salts of alkyl ether carboxylic acids, salts of alkyl aryl ether 15 carboxylic acids, and salts of alkylamido ether carboxylic acids; or the non-salified forms of all of these compounds, the alkyl and acyl groups of all of these compounds containing from 6 to 24 carbon atoms, and dimeric anionic surfactants represented by formula (I):



in which:

25 R₁ and R₃ denote, independently of each other, an alkyl radical containing from 1 to 25 carbon atoms;

R₂ denotes a spacer consisting of a linear or branched alkylene chain containing from 1 to 12 carbon atoms;

X denotes a group $-(\text{C}_2\text{H}_4\text{O})_a-(\text{C}_3\text{H}_6\text{O})_b\text{Z}$;

Y denotes a group $-(\text{C}_2\text{H}_4\text{O})_c-(\text{C}_3\text{H}_6\text{O})_d\text{Z}$;

30 in which

Z denotes a hydrogen atom or a radical $-\text{CH}_2-\text{COOM}$, $-\text{SO}_3\text{M}$, $-\text{P}(\text{O})(\text{OM})_2$, $-\text{C}_2\text{H}_4\text{SO}_3\text{M}$, or $-\text{C}_3\text{H}_5\text{SO}_3\text{M}$ group, in which M & M' represent H or an alkali metal or alkaline-earth metal or ammonium or alkanolammonium ion,

a and c, independently of each other, range from 0 to 15,

b and d, independently of each other, range from 0 to 10, and
the sum of $a + b + c + d$ ranges from 1 to 25; and n ranges from 1 to 10;

and

(ii) at least one nonionic surfactant selected from the group consisting
of: alkyl- and polyalkyl- esters of glycerol, mixtures of alkyl- and polyalkyl- esters of
glycerol with polyglyceryl, oxyalkylenated fatty acid esters of glycerol; oxyalkylenated
fatty acid esters of sorbitan; oxyalkylenated fatty acid esters; oxyalkylenated fatty
alcohol ethers, sugar esters, fatty alcohols, fatty alcohol ethers of sugars;

(b) organic UV filters; and

(c) uncoated pigments.

2. The sunscreen composition, according to claim 1, comprising from
1% to 10% by weight of stabilizing surfactant system, including all ranges and sub-
ranges there between, based on the total weight of the composition.

3. The sunscreen composition, according to claim 1, wherein the
stabilizing surfactant system comprises at least one anionic surfactant in an amount
ranging from 0.1% to 8% by weight, including all ranges and sub-ranges there between,
based on the total weight of the composition.

4. The sunscreen composition, according to claim 1, wherein the
stabilizing surfactant system comprises at least one nonionic surfactant in an amount
ranging from 0.1% to 9.5% by weight, including all ranges and sub-ranges there
between, based on the total weight of the composition.

5. The sunscreen composition, according to claim 1, wherein the
organic UV filters in the sunscreen composition ranges from 3% to 50% by weight,
based on the total weight of the composition.

6. The sunscreen composition, according to claim 1, wherein the
amount of the uncoated pigments in the sunscreen composition of the invention ranges
from 0.1% to 20% by weight, based on the total weight of the composition.

7. The sunscreen composition, according to claim 1, wherein the at
least one anionic surfactant is selected from the group consisting of glyceryl stearate
citrate and disodium ethylene dicocamide peg-15 disulfate.

8. The sunscreen composition, according to claim 1, wherein the at
least one non-ionic surfactant is selected from the group consisting of polyglyceryl-3
dicitrate/stearate, polyglyceryl-3 methylglucose distearate, arachidyl alcohol, behenyl
alcohol, arachidyl glucoside and cetareth-25.

9. The sunscreen composition, according to claim 1, wherein the organic UV filters are selected from the group consisting of oil-soluble organic sunscreen ingredients and water-soluble organic sunscreen ingredients.

10. The sunscreen composition, according to claim 9, wherein the oil-soluble organic sunscreen ingredients are selected from the group consisting of cinnamic derivatives, anthranilates, salicylic derivatives; dibenzoylmethane derivatives, camphor derivatives; benzophenone derivatives; diphenylacrylate derivatives; triazine derivatives; benzotriazole derivatives; benzalmalonate derivatives, benzimidazole derivatives; imidazolines; bis-benzoazolyl derivatives; p-aminobenzoic acid (PABA) derivatives; methylene bis(hydroxyphenylbenzotriazole), benzoxazole derivatives and mixtures thereof.

11. The sunscreen composition, according to claim 9, wherein water-soluble organic sunscreen ingredients are selected from the group consisting of terephthalylidene dicamphor sulfonic acid, phenylbenzimidazole sulfonic acid, benzophenone-4, aminobenzoic acid, 4-Bis(polyethoxy)-para-aminobenzoic acid polyethoxyethyl ester, camphor benzalkonium methosulfate, methylene bis-benzotriazolyl tetramethylbutylphenol, disodium phenyl dibenzimidazole tetrasulfonate and tris-biphenyl triazine; their derivatives and corresponding salts; and mixtures thereof.

12. The sunscreen composition, according to claim 1, wherein the uncoated pigments are selected from the group consisting of metal oxide pigments, such as titanium dioxide, zinc oxide, titanium oxide, iron oxide, zirconium oxide and cerium oxide, or mixtures thereof.

13. The sunscreen composition, according to claim 1, wherein it further comprises additional ingredients selected from inorganic UV filters, coated pigments, perfume/fragrance, preserving agents, solvents, actives, fatty compounds, vitamins, fillers, silicones, polymers and mixtures thereof.

14. The sunscreen composition, according to claim 1, wherein it is in the form of an O/W emulsion.

15. Use of the sunscreen composition, as defined in claim 1, wherein it is for the manufacture of a product to be used as sunscreen daily product.

16. A process of manufacturing the sunscreen composition, as defined in claim 1, comprising the following steps:

(a) preparing an oily phase by mixing the organic UV filters, the uncoated pigments and the stabilizing surfactant system, wherein the oily phase is heated until complete homogenization;

5 (b) adding an aqueous phase to the oily phase of step (a) under mixing until complete formation of the emulsion.

17. The process, according to claim 16, wherein the aqueous phase is prepared by mixing water and at least one additional ingredient.

18. The process, according claim 16, wherein step (a) further comprises the mixing of at least one additional ingredient.

10 19. The process, according to claim 17 or 18, wherein the at least one additional ingredient is selected from the group consisting of inorganic UV filters, coated pigments, perfume/fragrance, preserving agents, solvents, actives, fatty compounds, vitamins, fillers, silicones and polymers.

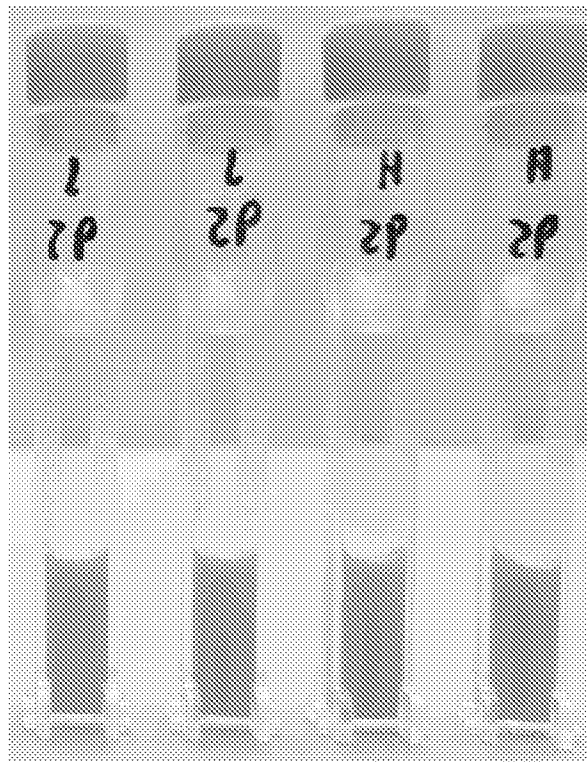
FIGURES

FIG. 1a

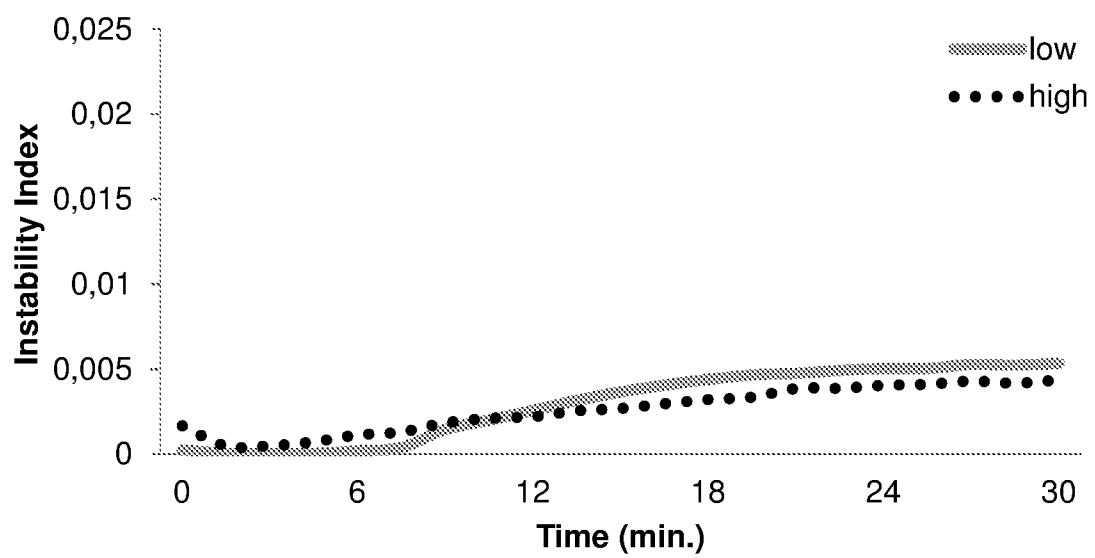


FIG. 1b

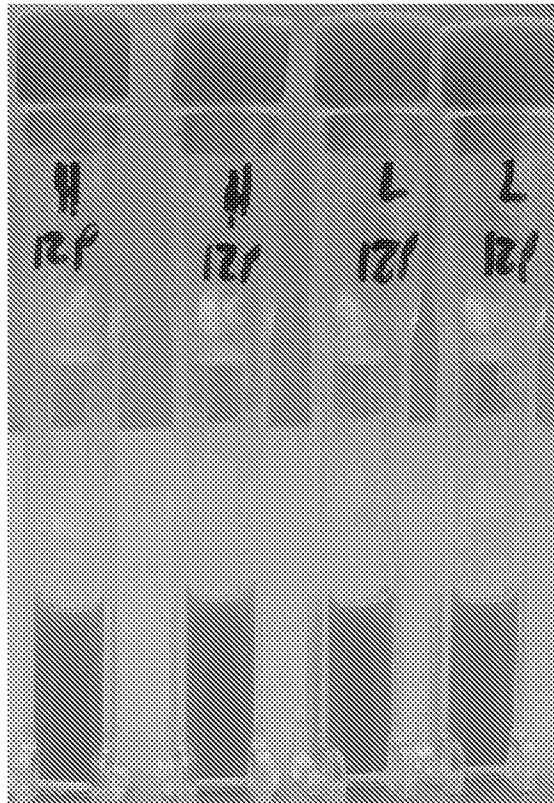
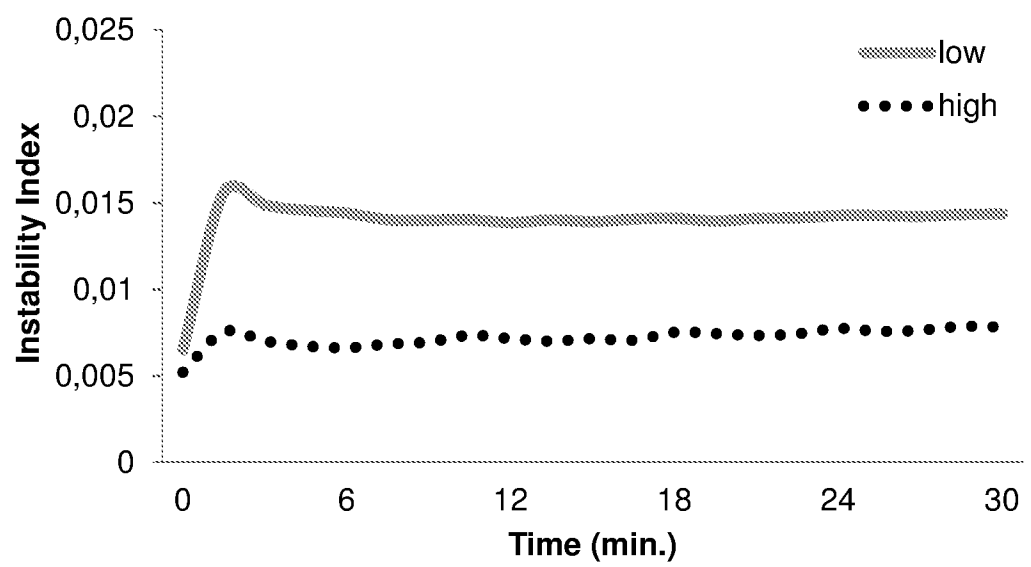


FIG. 2a

FIG. 2b



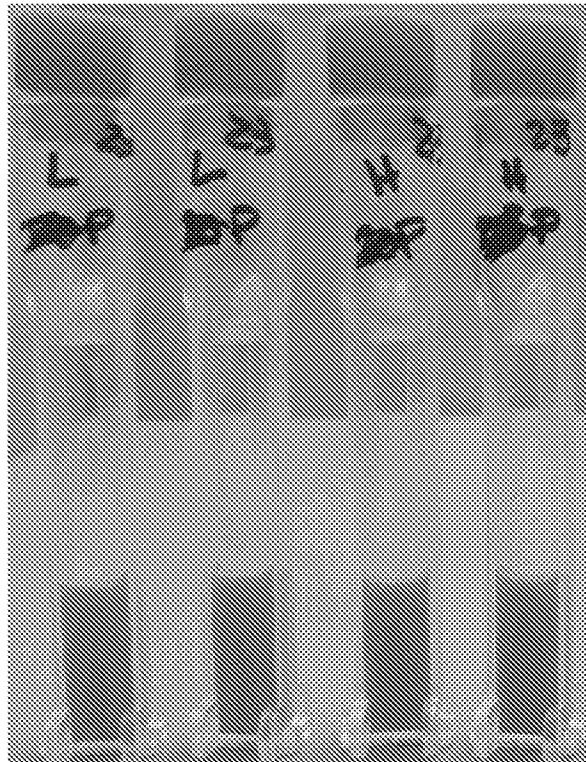


FIG. 3a

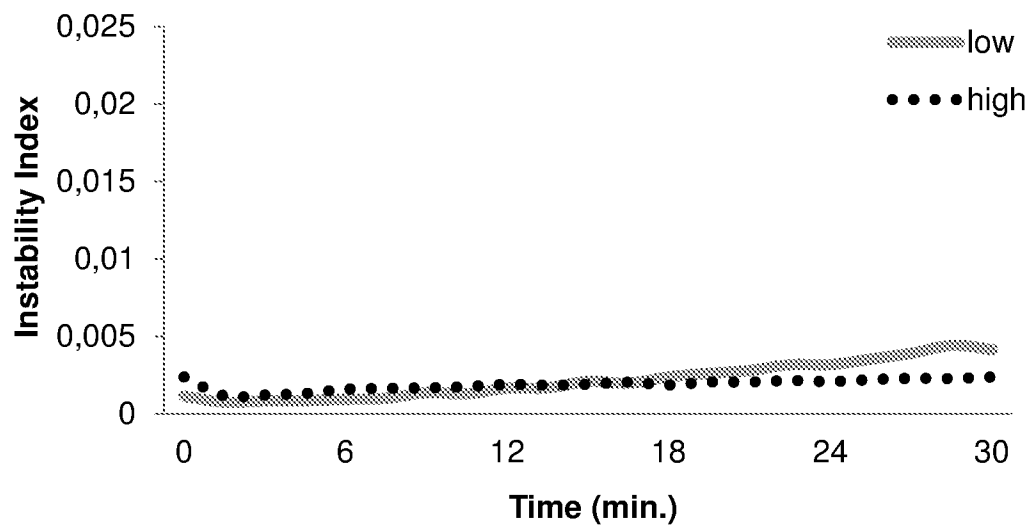


FIG. 3b

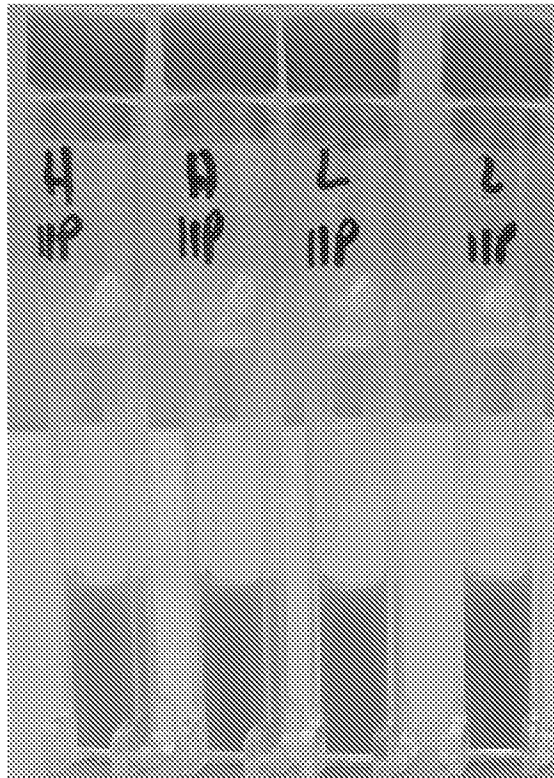


FIG. 4a

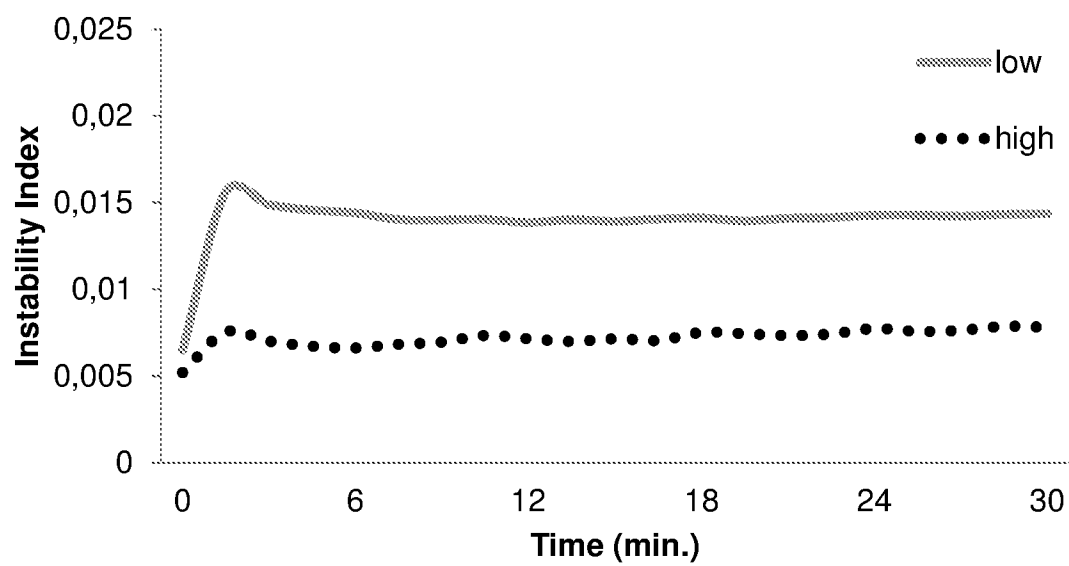


FIG. 4b

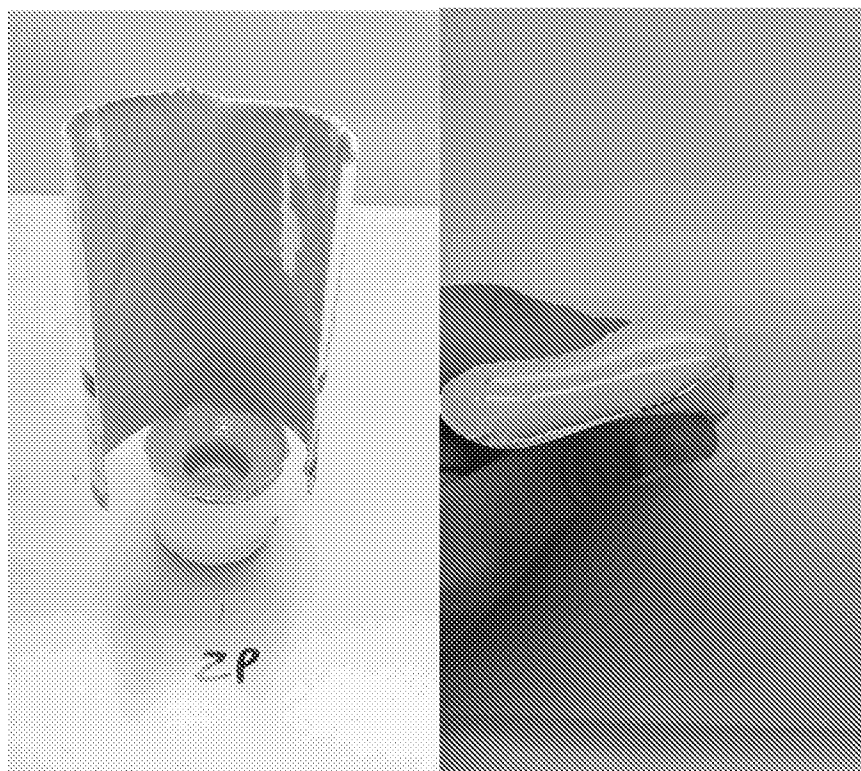


FIG. 5

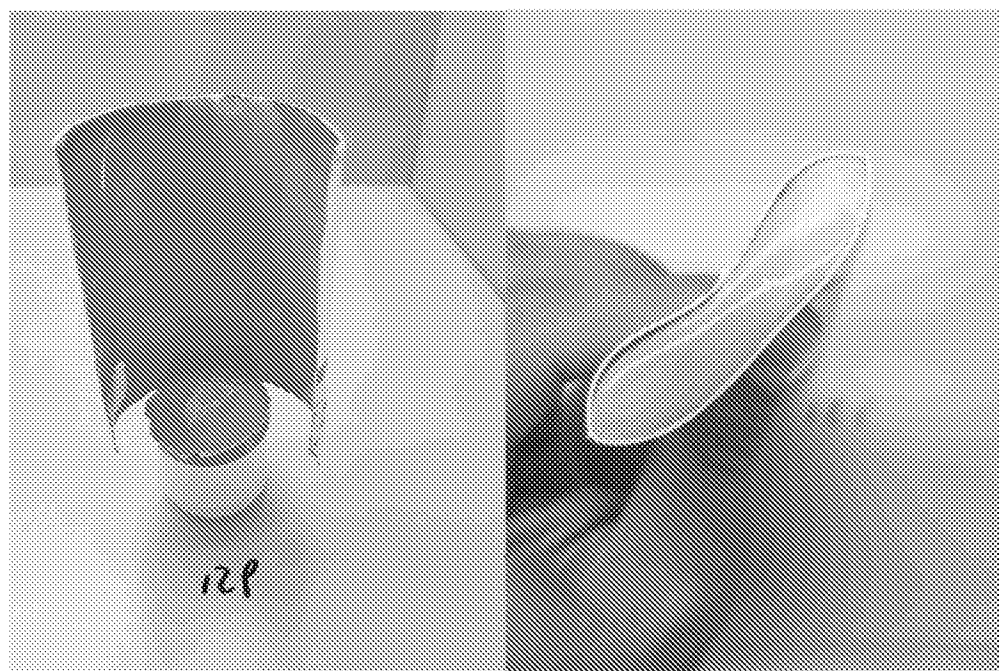


FIG. 6

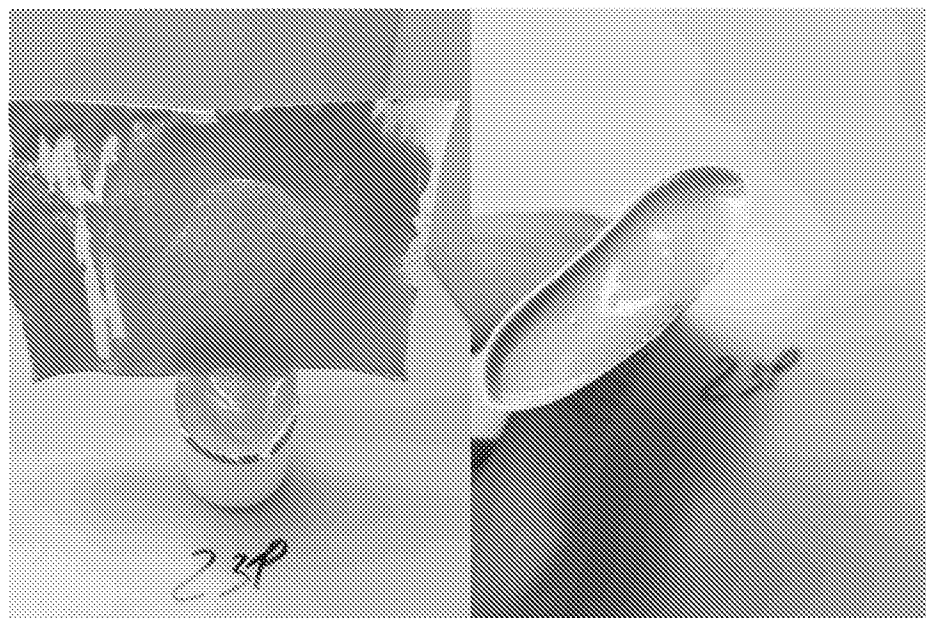


FIG. 7

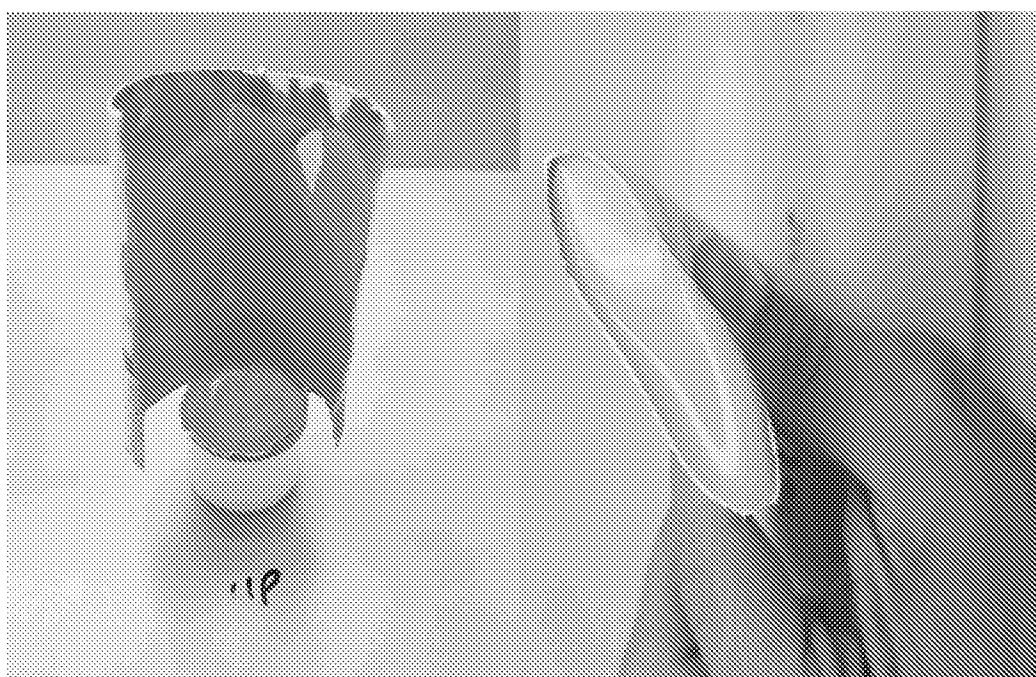


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/BR2019/050045

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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