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(54) Title: COMPOSITION, IN PARTICULAR COSMETIC COMPOSITION, HAVING A SOFT-FOCUS EFFECT

(57) Abstract: The present invention relates to an aqueous, in particular cosmetic, composition, especially for caring for and/or making up keratin materials, more particularly the skin and/or the lips, comprising at least microparticles comprising at least one linear fatty acid monoester crystallized in the form of an Lβ lamellar phase and of the formula (I) R_1-O-R_2, which are combined with at least one specific polyglycerolated nonionic surfactant.

Description

Title: Composition, in particular cosmetic composition, having a soft-focus effect

Technical field

The present invention is targeted at providing a composition, in particular a cosmetic composition, comprising a particulate material capable of providing this composition with an effectiveness in terms of soft-focus effect without furthermore impacting its sensorial qualities.

Prior art

The weakening of the visual perception of defects of color and of surface relief of keratin materials and more particularly of the skin is an effect desired by a large number of users of cosmetic products. This is because, in general, people exhibiting skin imperfections, either of color or of relief, such as, for example, irregularities related to acne scars or to aging, such as wrinkles, fine lines or dilated pores, desire to conceal these defects and use for this purpose cosmetic or dermatological compositions.

Many cosmetic compositions have already been developed with the aim of attempting to weaken this perception of defects or imperfections of the skin or, failing this, to deemphasize these defects and imperfections. To do this, these compositions generally comprise one or more light-scattering particulate active materials which is (are) capable of providing a soft-focus effect. Emmert, "Quantification of the Soft-Focus Effect", Cosmetics and Toiletries, 111, 57-61 (1996), discusses the attempt to create an artistic soft-focus effect by using such light-scattering ingredients. When the artistic soft-focus index is high, a composition produces a large soft-focus effect, serving to conceal the defects by modifying the perception of the relief.

It can in particular concern particles of boron nitride or particles of nylon, particles of spherical silica, silicone elastomers, flat powders, spherical powders, such as polymethyl methacrylate (PMMA), barium sulfate, and the like, and/or powders having a high refractive index, such as titanium dioxide, zinc oxide and iron oxide. However, such materials exhibit disadvantages, such as, for example, that of conferring an unnatural appearance on the skin due to their opacity, indeed even that of affecting the sensorial qualities of the compositions containing them. Thus, the formulations based on silicone elastomers can generate an

unpleasant feeling to the touch when these elastomers are present in a large amount. Furthermore, these active materials come within the category of microplastics and thus, as such, are not greatly appreciated by consumers. With regard to the other active materials, some of them provide a pilling effect during the application of the compositions containing them.

There thus remains a need for cosmetic compositions which are effective for conferring concealment or attenuation by soft-focusing on skin irregularities, either of color or of relief, for example blemishes, in an immediate and lasting fashion, while retaining pleasant sensorial qualities on application to these compositions.

There also remains a need for cosmetic compositions exhibiting improved soft-focus effect properties.

There also exists a need to provide cosmetic films on skin exhibiting irregularities, defects or imperfections which are completely transparent in the visible light range or which are capable of conferring a natural color while being transparent.

Unexpectedly and advantageously, the inventors have found that these objectives can be achieved by means of a specific particulate material and of the compositions containing them.

Summary of the invention

According to one of its aspects, the present invention relates to a composition, in particular a cosmetic composition, especially for caring for and/or making up keratin materials, more particularly the skin and/or lips, comprising at least:

- microparticles comprising at least one linear fatty acid monoester crystallized in the form of an Lβ lamellar phase and of the formula (I):

[Chem 1]

R_1-O-R_2 (I)

in which R_1 and R_2 are linear and saturated and have, independently of each other, a number of carbon atoms of greater than or equal to 16, with R_1 representing an acyl radical and R_2 representing an alkyl radical,

- at least one polyglycerolated nonionic surfactant of a fatty acid having at least 10 carbon atoms, said surfactant being chosen from polyglycerolated linear fatty acid monoesters, polyglycerolated linear fatty acid diesters and their mixtures, and

- water.

The present invention relates more particularly to a composition as described above comprising at least one polyglycerolated nonionic surfactant of a fatty acid having at least 10 carbon atoms and comprising at least 6 glycerol units, said surfactant being chosen from polyglycerolated linear fatty acid monoesters, polyglycerolated linear fatty acid diesters and their mixtures.

Contrary to all expectations, the inventors have thus found that the application, to a keratin material and more particularly the skin, in particular of the face, of a composition in accordance with the invention, that is to say containing in particular microparticles, as are defined above and described in detail below, makes it possible to significantly weaken, indeed even prevent, the visual perception of defects of color and/or of reliefs present at the surface of this keratin material.

As presented in the examples below, the microparticles formulated in this composition prove to be capable of providing an effective soft-focus effect.

Furthermore, the compositions containing them are devoid of the abovementioned disadvantages and thus remain advantageously endowed with the sensorial qualities expected by the users, namely a soft and non-pilling touch.

Finally, the microparticles under consideration according to the invention additionally have the quality of being formed of a crystalline fatty substance and thus of a nonsynthetic active material.

According to a specific embodiment, the microparticles under consideration according to the invention have a number-average particle size D50 ranging from 0.5 µm to 15 µm, preferably from 3 µm to 10 µm.

The term “median size” of an assembly of particles, denoted D50, refers to the size dividing the particles of this assembly into first and second populations which are equal in number, these first and second populations comprising only particles exhibiting a size respectively greater than or less than the median size.

According to another specific embodiment, these microparticles consist of one or more fatty acid monoesters crystallized in the form of an Lβ lamellar phase.

According to a specific embodiment, the Lβ lamellar phase is orthorhombic.

According again to a specific embodiment, a composition according to the invention is an emulsion and in particular of oil-in-water type.

According to another of its aspects, the present invention relates to a process for the preparation of microparticles comprising at least one linear fatty acid monoester crystallized in the form of an Lβ lamellar phase, comprising at least the steps consisting in:

(a) providing a mixture containing at least:

- in the molten state, at least one linear fatty acid monoester of the formula (I):

[Chem 2]

R_1-O-R_2 (I)

in which R_1 and R_2 are linear and saturated and have, independently of each other, a number of carbon atoms of greater than or equal to 16, with R_1 representing an acyl radical and R_2 representing an alkyl radical,

- at least one polyglycerolated nonionic surfactant of fatty acid having at least 10 carbon atoms, said surfactant being chosen from polyglycerolated and linear monoesters of fatty acid, polyglycerolated and linear diesters of fatty acid and their mixtures, and

- water,

(b) forming an oil-in-water emulsion in which said fatty acid monoester of formula (I) is dispersed in the state of droplets,

(c) cooling said emulsion in order to transform said droplets to the state of microparticles comprising at least said fatty acid monoester of formula (I) crystallized in the form of an Lβ lamellar phase, which is in particular orthorhombic, and

(d) if appropriate, recovering said microparticles.

The present invention relates more particularly to a process as described above, providing in step (a) a mixture containing at least one polyglycerolated nonionic surfactant of fatty acid having at least 10 carbon atoms and comprising at least 6 glycerol units, said surfactant being chosen from polyglycerolated and linear monoesters of fatty acid, polyglycerolated and linear diesters of fatty acid and their mixtures.

According to an alternative embodiment, another subject matter of the invention is a process for the preparation of a composition in accordance with the invention comprising at least steps (a) to (c) as described in detail above, with preferably at least one of said steps being carried out in the presence of at least one cosmetic or therapeutic active principle and/or said

process additionally comprising at least one supplementary step of addition of at least one cosmetic or therapeutic active principle or of water.

According to another of its aspects, the present invention relates to the cosmetic use of the microparticles obtained according to the process of the invention and in particular as fillers having a soft-focus effect.

According to yet another of its aspects, the present invention relates also to a composition, in particular a cosmetic composition, especially for caring for and/or making up keratin materials, more particularly the skin and/or lips, comprising at least microparticles obtained by the process according of the invention. Such a composition may be further as defined below.

According to yet another of its aspects, the present invention relates to a cosmetic treatment method, in particular a method for making up and/or caring for keratin materials, in particular the skin and/or the lips, comprising at least one step consisting in applying, to said keratin material, a composition in accordance with the invention.

In particular, the present invention is also targeted at a cosmetic method for improving the surface appearance of a keratin material, in particular of the skin, especially exhibiting irregularities of relief and/or of color and preferably irregularities of relief, comprising at least one step consisting in applying, to said keratin material, a composition in accordance with the invention. Mention may very particularly be made, as example of irregularity of color, of freckles.

It also provides a method for improving the appearance of aged skin or skin exhibiting blemishes of relief or of skin, in particular irregularities related to dermatoheliosis, acne scars, fine lines, dilated pores or hyperkeratinization, by application of a composition in accordance with the invention.

Detailed description

Within the meaning of the present invention:

- The term “skin” is intended to denote all of the skin of the body, including the lips, and preferably the skin of the face, of the neck and of the neckline, and also the lips.
- The term “aged skin” is intended to denote skin exhibiting signs of aging, such as wrinkles.

- The expression "skin exhibiting irregularities of relief or of coloration" denotes skin exhibiting skin irregularities or blemishes, in particular related to dermatoheliosis, to acne scars, to fine lines, to dilated pores or to hyperkeratinization.
- The term "ambient temperature" is intended to denote a temperature of approximately 25°C. It is determined at atmospheric pressure (i.e., a pressure of 1.013×10^5 Pa).
- A "nonvolatile oil" is an oil, the vapor pressure of which at ambient temperature and atmospheric pressure is nonzero and less than 10^{-3} mmHg (0.13 Pa).

Microparticles in accordance with the invention

As stated above, the microparticles under consideration according to the invention comprise at least one linear fatty acid monoester crystallized in the form of an Lβ lamellar phase and of the formula (I):

[Chem 3]

R_1-O-R_2 (I)

in which R_1 and R_2 are linear and saturated and have, independently of each other, a number of carbon atoms of greater than or equal to 16, with R_1 representing an acyl radical and R_2 representing an alkyl radical.

Within the meaning of the invention, "Lβ lamellar phase" can also be described as "Lβ paracrystalline phase" or "gel lamellar phase".

Lβ lamellar phase is understood to mean a phase in which the linear fatty acid monoester molecules are organized in the form of spaced-out bimolecular layers. The lamellar phase system is thus represented according to the invention by a stack of crystalline wax lamellae. In a more detailed way, the linear fatty acid molecules are distributed, within the bimolecular layers, according to a hexagonal geometry; their hydrocarbon chains are in a crystalline state and are oriented perpendicularly to the plane of the bimolecular layers but do not have a specific orientation with respect to one another in the plane of these layers.

In other words, the Lβ paracrystalline phases are metastable phases within which the fatty chains are in the solid state and are positioned randomly with respect to one another, unlike the micellar, hexagonal, cubic and lamellar fluid paracrystalline phases (Lα) within which the fatty chains are in the liquid state and unlike the crystalline phases within which the fatty chains are in the solid state and are oriented in an ordered manner with respect to one another.

The Lβ paracrystalline phases are metastable and generally they have a tendency to change toward crystallization. The specific surfactant system also required according to the invention makes it possible precisely to stabilize this Lβ paracrystalline phase.

Use may be made, in order to characterize the Lβ lamellar phase or Lβ paracrystalline phase in the composition of the invention, of different techniques and in particular the X-ray diffraction technique, in particular the wide-angle X-ray scattering (WAXS) technique.

Size of the particles

The microparticles have a D50 size ranging from 0.5 μm to 15 μm, preferably from 3 μm to 10 μm.

The sizes of the particles can in particular be measured by laser particle sizing or by image analysis.

The microparticles can have an aspect ratio of more than 0.6, preferably more than 0.8, more preferentially more than 0.9, or even more than 0.95, or even more than 0.99, and for example of 1.

The "aspect ratio" of a particle is equal to the ratio of the smallest axis to the largest axis of the smallest circumscribing ellipsoid of the particle. As an example, a particle with a spherical shape which is circumscribed by a sphere has an aspect ratio equal to 1. The "aspect ratio" can be measured from an image acquired by optical microscopy.

The microparticles can have the shape of a dented sphere. In particular, the microparticles can be spherulites.

Fatty acid monoester

The microparticles according to the invention comprise at least one linear fatty acid monoester which is crystalline and thus in an Lβ paracrystalline phase.

These microparticles can comprise at least 30% by weight, in particular at least 50% by weight, better still at least 60% by weight, of one or more fatty acid monoesters crystallized in the form of an Lβ lamellar phase, with respect to their particulate weight.

The linear fatty acid monoester(s) under consideration according to the invention have the following formula (I):

[Chem 4]

R_1-O-R_2 (I)

in which R_1 and R_2 are linear and saturated and have, independently of each other, a number of carbon atoms of greater than or equal to 16, with R_1 representing an acyl radical and R_2 representing an alkyl radical.

This or these fatty acid monoester(s) is employed in the microparticles according to the invention in an individualized form or in the form of a mixture comprising exclusively linear fatty acid monoesters of formula (I).

In a specific embodiment, the fatty acid monoester(s) crystallized in the form of an Lβ lamellar phase exhibit a melting point of greater than or equal to 50°C. The melting point can be measured by any known method and in particular using a differential scanning calorimeter (DSC).

According to a preferred embodiment of the invention, the acyl and alkyl radicals representing respectively R_1 and R_2 are chosen so that the compound (I) is solid at a temperature of less than or equal to 30°C.

According to a particularly preferred embodiment of the invention, R_1 and R_2 are respectively acyl and alkyl radicals having a number of carbon atoms varying from 16 to 22, preferably from 18 to 22 and more preferentially from 20 to 22.

According to a particularly preferred embodiment, R_1 and R_2 are respectively acyl and alkyl radicals having the same number of carbon atoms.

In particular, the fatty acid monoester(s) according to the invention is (are) chosen from behenyl behenate, arachidyl arachidate, stearyl stearate and their mixtures, preferably comprises at least behenyl behenate and in particular consists of behenyl behenate.

A behenyl behenate suitable for the composition according to the invention can in particular be chosen from Kester Wax K-72 sold by Koster Keunen, DUB BB sold by Stéarinerie Dubois and Dermowax BB sold by Alzo.

According to a particular embodiment of the invention, a composition according to the invention can comprise at least 3% by weight, preferably at least 5% by weight and more preferentially at least 10% by weight of fatty acid monoester(s) crystallized in the form of an Lβ lamellar phase, with respect to the total weight of said composition.

As stated above, the linear fatty acid monoester(s) component is crystallized as an Lβ lamellar phase, that is to say in the form of lamellae or layers.

According to an alternative form, said microparticles can additionally contain at least one ancillary chemical entity, thus distinct from a linear fatty acid monoester in accordance with the invention, and in particular at least one nonvolatile hydrocarbon oil, within this Lβ lamellar phase. These microparticles can then be described as "filled", in contrast to "nonfilled" when they are devoid of any ancillary chemical entity within their lamellar structure. This nonvolatile hydrocarbon oil can in particular be chosen from dialkyl carbonates in C_{15} to C_{18} and their mixtures, and preferably is at least dicaprylyl carbonate.

The microparticles can thus contain at least 10% by weight, preferably from 15% to 25% by weight, of nonvolatile hydrocarbon oil(s), with respect to their particulate weight. A composition according to the invention can thus comprise at least 1.25% by weight, preferably from 2.5% to 7% by weight, of nonvolatile hydrocarbon oil(s), with respect to its total weight.

In particular, a composition according to the invention can comprise at least 7.5% by weight, in particular from 10% to 35% by weight and especially from 20% to 30% by weight of microparticles, with respect to its total weight.

As stated above, the microparticles are employed according to the invention in a form combined with at least one fatty acid polyglycerolated surfactant, also referred to as ester of polyglycerol and of fatty acid.

Fatty acid polyglycerolated surfactant

This surfactant component makes it possible to stabilize the microparticles in aqueous dispersion.

A composition according to the invention can comprise at least 0.5% by weight, preferably from 1% to 7% by weight, of polyglycerolated surfactant(s), with respect to the total weight of said composition.

According to the present invention, the ester of polyglycerol and of fatty acid is chosen from polyglycerolated linear fatty acid monoesters, polyglycerolated linear fatty acid diesters and their mixtures.

It can comprise at least 6 glycerol units, in particular from 10 to 14 glycerol units.

Its fatty acid comprises at least 10 carbon atoms, preferably from 12 to 18 carbon atoms and better still from 12 to 16 carbon atoms.

The fatty acids comprising at least 10 carbon atoms can be saturated or unsaturated.

The fatty acids can be chosen from oleic acid, stearic acid, lauric acid, palmitic acid, myristic acid, linoleic acid, capric acid and their mixtures.

According to a preferred embodiment, use is made of an ester of polyglycerol and of fatty acid chosen from the esters resulting from the reaction of polyglycerol comprising from 8 to 14 glycerol units, preferably from 10 to 14 glycerol units, and of at least one fatty acid comprising from 10 to 16 carbon atoms and better still from 12 to 14 carbon atoms.

Mention may in particular be made, by way of representation and without limitation of such surfactants, of the following esters: Polyglyceryl-10 Dilaurate, Polyglyceryl-10 Dioleate, Polyglyceryl-6 Dipalmitate, Polyglyceryl-10 Dipalmitate, Polyglyceryl-10 Cocoate, Polyglyceryl-10 Laurate, Polyglyceryl-10 Mono/Dioleate, Polyglyceryl-10 Myristate, Polyglyceryl-10 Palmate, Polyglyceryl-10 Palmitate, Polyglyceryl-10 Polyricinoleate, Polyglyceryl-10 Stearate, Polyglyceryl-6 Undecylenate, Polyglyceryl-10 Undecylenate and their mixtures, in particular Polyglyceryl-10 Dilaurate, Polyglyceryl-10 Dioleate, Polyglyceryl-6 Dipalmitate, Polyglyceryl-10 Dipalmitate, Polyglyceryl-10 Laurate, Polyglyceryl-10 Mono/Dioleate, Polyglyceryl-10 Myristate, Polyglyceryl-10 Palmitate, Polyglyceryl-10 Stearate, Polyglyceryl-6 Undecylenate, Polyglyceryl-10 Undecylenate and their mixtures.

In particular, the composition comprises fatty acid polyglycerolated surfactant(s) having all the same number of glycerol units. The composition can comprise fatty acid polyglycerolated surfactant(s) having all the same number of carbon atoms. Preferably, the composition comprises only one kind of polyglycerolated nonionic surfactant of a fatty acid having at least 10 carbon atoms and comprising at least 6 glycerol units.

According to a specific embodiment, the ester of polyglycerol and of fatty acid is chosen from the esters resulting from the reaction of polyglycerol comprising from 10 to 14 glycerol units and of at least one fatty acid comprising from 12 to 16 carbon atoms, such as lauric acid.

According to a specific embodiment, this surfactant comprises at least polyglyceryl-10 laurate.

Mention may very particularly be made of the ester resulting from the reaction of polyglycérol-10 (glycerol homopolymer comprising 10 glycerol units) and of lauric acid (INCI name: polyglyceryl-10 laurate) sold by Dr Straetmans under the reference Dermofeel G 10 L.

According to a specific embodiment, a composition according to the invention contains at least:

- microparticles of behenyl behenate crystallized in an Lβ lamellar phase, in particular at a content of behenyl behenate varying from 5% to 25% by weight, with respect to the total weight of the composition,
- polyglyceryl-10 laurate, in particular in a proportion of 0.5% to 4% by weight, with respect to the total weight of the composition, and
- water.

Process for the preparation of the microparticles

The present invention also provides a process for the preparation of microparticles comprising at least one linear fatty acid monoester crystallized in the form of an Lβ lamellar phase, said process comprising at least the steps consisting in:

(a) providing a mixture containing at least:

- in the molten state, at least one linear fatty acid monoester of the formula (I):

[Chem 5]

R_1-O-R_2 (I)

in which R_1 and R_2 are linear and saturated and have, independently of each other, a number of carbon atoms of greater than or equal to 16, with R_1 representing an acyl radical and R_2 representing an alkyl radical, in particular as described in detail above and especially at least behenyl behenate,

- at least one polyglycerolated nonionic surfactant of fatty acid having at least 10 carbon atoms, said surfactant being chosen from polyglycerolated and linear monoesters of fatty acid, polyglycerolated and linear diesters of fatty acid and their mixtures, and in particular as described in detail above and especially at least polyglyceryl-10 laurate, and
- water,

(b) forming an oil-in-water emulsion in which said fatty acid monoester of formula (I) is dispersed in the state of droplets,

(c) cooling said emulsion in order to transform said droplets to the state of microparticles comprising at least said fatty acid monoester of formula (I) crystallized in the form of an Lβ lamellar phase, which is in particular orthorhombic, and

(d) if appropriate, recovering said microparticles.

In particular, the mixture of step (a) comprises at least one fatty acid monoester of formula (I) as defined above, said linear fatty acid monoester(s) preferably being at a content ranging from 20% to 40% by weight, with respect to the total weight of said mixture.

In particular, the mixture of step (a) can comprise at least one polyglycerolated surfactant as defined above, said surfactant(s) preferably being at a content ranging from 2% to 3.5%, with respect to the total weight of said mixture.

In an alternative form, the mixture of step (a) can additionally comprise at least one nonvolatile hydrocarbon oil, especially as defined above, more particularly dicaprylyl carbonate, in particular at a content ranging from 5% to 15% by weight, with respect to the total weight of said mixture.

According to an alternative embodiment, the mixture in step (a) additionally comprises, in the molten state, at least one pasty compound and especially shea butter.

Prior to being brought into contact with the water, which may already contain said polyglycerolated surfactant component, all the pasty compound, wax and solid fatty components, considered to form the microparticles, are brought to a temperature compatible with their transformation to a liquid state, that is to say to their melting. This temperature can generally vary from 50°C to 95°C and preferably from 55°C to 85°C.

The oily phase thus formed is brought into contact with the water in the presence of at least one fatty acid polyglycerolated surfactant in accordance with the invention and the mixture thus formed is energetically stirred, for example with a rotor, in order to disperse the oily phase in the state of stabilized droplets in the aqueous phase. More specifically, the droplets can be produced by virtue of a rotor-stator system, the adjustment of the powers and air gap of which makes it possible to adjust the size of the microparticles.

The dispersion of stabilized droplets which is thus formed is cooled with stirring below the melting point of the fatty acid monoester(s) of formula (I) in order to bring about their crystallization in the form of an Lβ lamellar phase, which is in particular orthorhombic. In step (c), the emulsion is preferably cooled with stirring at a lower shear rate than in step (b), in particular more than two times lower, more particularly more than three times lower than in step (b). The emulsion can be cooled by stirring with a stirrer different from a rotor-stator system. Preferably, the emulsion can be cooled with a propeller stirrer or a blade stirrer. In particular, the emulsion is cooled without stirring with a rotor-stator system. The cooling with a gentle stirring allows advantageously to maintain a good homogeneity of the emulsion without having an impact on the particles. Advantageously, the size and the shape of the droplets formed in step (b) are not modified significantly during cooling. In particular, dented spherical microparticles can be obtained after cooling. This cooling is generally carried out by simple thermal transfer between the medium of synthesis of the microparticles and the walls of the vessel in which the preparation of the microparticles is carried out. In particular, the vessel can have a double-jacket shell, more particularly at a controlled temperature. The emulsion can be cooled down to ambient temperature, in particular between 20°C and 30°C, in a duration of at least 15 min, in particular from 30 min to 5 hours, more particularly from 45 min to 2 hours. Preferably, the emulsion is cooled down at a cooling rate lower than 80°C/h, in particular comprised between 30°C/h and 65°C/h, more particularly between 45°C/h and 50°C/h.

The dispersion of microparticles thus formed can be used as is as base for a cosmetic composition having a soft-focus effect.

It can also be envisaged to isolate the microparticles by separating them from the aqueous phase in which they are formulated in order to incorporate them as is in cosmetic formulations. For example, the microparticles can be recovered in a lyophilized form.

Thus, the present invention is also targeted at the cosmetic use of the microparticles obtained by this process, in particular as fillers having a soft-focus effect.

Composition according to the invention

The compositions, in particular cosmetic compositions, of course comprise a physiologically acceptable medium, that is to say a non-toxic medium which can be applied to the human

keratin material, in particular the skin and more particularly the skin of the face, and which exhibits a pleasant appearance, a pleasant odor and a pleasant feel.

The composition according to the invention comprises an aqueous phase, which generally forms the continuous phase of the composition.

According to a specific embodiment, the compositions of the present invention comprise from 30% to 80% by weight of aqueous phase, with respect to the total weight of the composition, preferably from 40% to 70% by weight, with respect to the total weight of the composition.

The aqueous phase comprises water and can consist of water.

Furthermore, it can also comprise at least one water-soluble solvent.

In the present invention, the term "water-soluble solvent" denotes a compound which is liquid at ambient temperature and which is miscible with water.

The water-soluble solvents which can be used in the compositions according to the invention can additionally be volatile.

Mention may in particular be made, among the water-soluble solvents which can be used in the compositions in accordance with the invention, of lower monoalcohols having from 1 to 5 carbon atoms, such as ethanol and isopropanol, or glycols having from 2 to 8 carbon atoms, such as ethylene glycol, propylene glycol, 1,3-butylene glycol and dipropylene glycol.

Generally, a composition according to the invention contains said microparticles in aqueous dispersion, with in particular at least one polyglycerolated surfactant.

The compositions according to the invention having a soft-focus effect can in particular be characterized by their optical properties and in particular by haze and transmission values.

For the record, the transparency of a material is expressed by the nonabsorption of the energy of the light wave passing through it. In other words, the transparency corresponds to the percentage not reflected and not absorbed by a material. If the light scatters in a transparent material, that is to say if there is a nonhomogeneity of the optical index at the microscopic level in the material, the latter can then be described as translucent. Macroscopically, a translucent material always follows the Snell-Descartes law.

The haze is the consequence of the scattering of the light through a transparent material. It results from the deflection of these rays, a fall in the high spatial frequencies of the image seen through the material rendering the latter more “soft-focused”. The "haze" corresponds to the percentage of scattered light with respect to the total transmittance according to the standard ASTM D 1003 (Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics).

Thus, the compositions according to the invention advantageously have a haze value of greater than 80% and preferably of greater than 90%. This value range advantageously makes it possible to provide the expected soft-focus effect.

Likewise, the compositions according to the invention advantageously have a transmission value of greater than 80% and preferably of greater than 90%. This range of transmission values advantageously makes it possible to provide the expected translucent effect.

These haze and transmission values can in particular be determined according to the methods described in detail in the Materials and methods chapter below.

The compositions can also contain at least one pasty compound in particular chosen from the esters of an oligomeric glycerol, in particular diglycerol esters, especially condensates of adipic acid and of glycerol, for which a part of the hydroxyl groups of the glycerols have reacted with a mixture of fatty acids, such as stearic acid, capric acid, stearic acid, isostearic acid and 12-hydroxystearic acid, such as those in particular sold under the Softisan 649 brand by Sasol; or also dimer diol and dimer diacid esters, if appropriate esterified on their free alcohol or acid functional group(s) by acid or alcohol radicals, in particular dimer dilinoleate esters; such as the products sold under the Plandool brand (bis-behenyl/isostearyl/phytosteryl dimer dilinoleyl dimer dilinoleate (Plandool G), phytosteryl/isostearyl/cetyl/stearyl/behenyl dimer dilinoleate (Plandool H or Plandool S)); or also butters of vegetable origin, and their mixtures, and in particular shea butter. In particular, the compositions can additionally comprise shea butter, preferably in a proportion of at least 2% by weight, in particular from 3% to 8% by weight, with respect to the total weight of said composition. This is because the inventors have found that a pasty composition makes it possible to very particularly improve the properties on application of a composition according to the invention. It is pleasant on application and a pilling effect undesired by the users is furthermore not observed.

Thus, according to an alternative embodiment, a composition according to the invention can comprise at least:

- microparticles of behenyl behenate crystallized in an Lβ lamellar phase, in particular at a content of behenyl behenate varying from 5% to 20% by weight, with respect to the total weight of the composition,
- polyglyceryl-10 laurate, in particular in a proportion of 0.75% to 2.5% by weight, with respect to the total weight of the composition,
- shea butter, in particular in a proportion of 1% to 5% by weight, with respect to the total weight of the composition, and
- water.

The composition can also comprise at least one oil.

Mention may be made, as oils which can be used, for example, of:

- hydrocarbon oils of vegetable origin, such as liquid triglycerides of fatty acids comprising from 4 to 10 carbon atoms, such as triglycerides of heptanoic or octanoic acids, or also, for example, sunflower oil, corn oil, soybean oil, pumpkin oil, grapeseed oil, sesame oil, hazelnut oil, apricot oil, macadamia oil, arara oil, castor oil, avocado oil, caprylic/capric acid triglycerides, such as those sold by Stéarinerie Dubois or those sold under the names Miglyol 810, 812 and 818 by Dynamit Nobel, jojoba oil or shea butter oil;
- synthetic esters and ethers, in particular of fatty acids, such as the oils of formulae R_1COOR_2 and R_1OR_2 in which R_1 represents the residue of a fatty acid comprising from 8 to 29 carbon atoms and R_2 represents a branched or unbranched hydrocarbon chain containing from 3 to 30 carbon atoms, such as, for example, Purcellin oil, isononyl isononanoate, isopropyl myristate, 2-ethylhexyl palmitate, 2-octyldodecyl stearate, 2-octyldodecyl erucate, isostearyl isostearate; hydroxylated esters, such as isostearyl lactate, octyl hydroxystearate, octyldodecyl hydroxystearate, diisostearyl malate or triisocetyl citrate; heptanoates, octanoates or decanoates of fatty alcohols; polyol esters, such as propylene glycol dioctanoate, neopentyl glycol diheptanoate and diethylene glycol diisononanoate; and pentaerythritol esters, such as pentaerythrityl tetraisostearate;
- linear or branched hydrocarbons of mineral or synthetic origin, such as liquid paraffins, which are volatile or nonvolatile, and their derivatives, liquid petrolatum, polydecenes or hydrogenated polyisobutene, such as Parleam oil;

- fatty alcohols having from 8 to 26 carbon atoms, such as cetyl alcohol, stearyl alcohol and their mixture (cetylstearyl alcohol), octyldodecanol, 2-butyloctanol, 2-hexyldecanol, 2-undecylpentadecanol, oleyl alcohol or linoleyl alcohol;
- silicone oils, such as volatile or nonvolatile polymethylsiloxanes (PDMSs) with a linear or cyclic silicone chain, which are liquid or pasty at ambient temperature, in particular cyclopolydimethylsiloxanes (cyclomethicones), such as cyclohexasiloxane; polydimethylsiloxanes comprising alkyl, alkoxy or phenyl groups, which are pendent or at the end of the silicone chain, which groups have from 2 to 24 carbon atoms; or phenylated silicones, such as phenyl trimethicones, phenyl dimethicones, phenyl(trimethylsiloxy)diphenylsiloxanes, diphenyl dimethicones, diphenyl(methyldiphenyl)trisiloxanes, (2-phenylethyl)trimethylsiloxysilicates and polymethylphenylsiloxanes, and
- their mixtures.

The term “hydrocarbon oil” in the list of the abovementioned oils is understood to mean any oil predominantly comprising carbon and hydrogen atoms and optionally ester, ether, fluorinated, carboxylic acid and/or alcohol groups.

A composition of the invention can also comprise any additive generally used in the field of application under consideration. For example, a composition according to the invention can comprise one or more additives chosen from colorants, film-forming agents, structuring polymers, dispersants, antioxidants, essential oils, preservatives, fragrances, fat-soluble polymers dispersible in the medium, fillers, neutralizing agents and cosmetic and dermatological active principles, such as, for example, emollients, moisturizing agents, vitamins, antiwrinkle agents, essential fatty acids, sunscreens and their mixtures.

Of course, a person skilled in the art will take care to select the optional additional additives and/or their amounts so that the advantageous properties of the composition according to the invention are not substantially, indeed even negatively, affected by their presence.

These additives can be present in a composition of the invention in a proportion of 0.1% to 10% by weight, with respect to the total weight of the composition.

According to a specific embodiment, the compositions according to the invention can comprise at least one colorant chosen from pigments, dyes, such as fat-soluble dyes, pearlescent pigments, pearlescent agents and their mixtures.

The representative fat-soluble dyes which can be used according to the present invention comprise Sudan Red, DC Red 17, DC Green 6, β-carotene, soybean oil, Sudan Brown, DC Yellow 11, DC Violet 2, DC Orange 5, anatto and quinoline yellow. The fat-soluble dyes, when they are present, generally have a concentration ranging up to 20% by weight of the total weight of the composition, such as from 0.0001% to 6%.

Preferably, the aqueous cosmetic compositions according to the invention are aqueous emulsions or dispersions.

In particular, they can be in the form of a makeup composition for the lips, for example lipsticks or liquid lipsticks, and/or skin, in particular of the face, such as, for example, a foundation.

A composition according to the invention can also be in the form of a care composition for the skin and/or lips, in the form, for example, of a sunscreen composition. It can be used in particular as care base for the skin or lips (lip balms, for protecting the lips from the cold and/or from the sun and/or from the wind, or care cream for the skin).

In particular, a cosmetic composition according to the invention is dedicated to conferring concealment of irregularities or of imperfections in the relief of skin exhibiting such irregularities or imperfections or of aged skin.

Thus, the cosmetic compositions according to the present invention can in particular be applied to aged skin.

The examples which follow are presented by way of illustration and without limitation of the range of the invention.

Materials and methods

The optical properties of the compositions tested are characterized by measurement of their haze values (soft-focus effect, veil or tracing) and transmission values (or also transparent effect) according to the standard ASTM D 1003 with a commercial appliance of hazemeter type.

The measurements are carried out according to the following protocol:

a- spreading, over a transparent plastic film (polyester, Byk), a layer with a wet thickness of 50 µm of the composition, the haze of which it is desired to evaluate, using an automatic spreader,

b- leaving to dry at ambient temperature (20°C-25°C) for one hour,

c- measuring the haze index and the transparency using a Haze Gard of the Byk Gardner brand. The collimated white light source was turned on one hour before the measurements. After calibration of the device, the film previously dried was placed in the device for measurement. Five measurements were done on each sample and the mean value was reported. The haze corresponds to the scattered transmitted light/total transmitted light. The transmission corresponds to the percentage not reflected and not absorbed.

Example 1

Compositions 1 to 4 in accordance with the invention, in the form of an oil-in-water emulsion, are prepared from the proportions by weight as described in detail in table 1 below. The values are expressed in the table below as percentage by weight, with respect to the total weight of each composition.

[Table 1]

	Composition (% by weight)			
	1	2	3	4
Glycerol	5	10	5	15
Polyglyceryl-10 laurate (Dermofeel G 10® from Dr Straetmans (Evonik))	1.25	1.25	1.25	1.75
Behenyl behenate (Kester Wax K-72® from Koster Keunen)	15	15	15	15
Dicaprylyl carbonate (Cetiol CC® from BASF)	5	5	5	5
Caprylyl glycol	0.25	0.25	0.25	0.25
Chlorphenesin	0.25	0.25	0.25	0.25
Biosaccharide gum-1 (Fucogel 1.5P® from Solabia)	0.011	1	1	1
Xanthan gum (Keltrol CG-T® from CP Kelco)	0.1	1	1	1
Carbomer (Synthalen K® from 3V)	0.5	3	3	3
Isononyl isononanoate	1	0.1	0.1	0.1
Caprylic/capric triglyceride (DUB MCT 7030/MB® from Stéarinerie Dubois)	3	0.5	0.5	0.5
Sodium hydroxide	0.15	0.15	0.15	0.15
Alcohol	5	5	5	5
Tocopherol	0.0025			
Shea butter (Lipex Shea® from AarhusKarlshamn)	3			
Citric acid	0.00003			
Phenoxyethanol	0.015			
Deionized water	q. s. for 100	q. s. for 100	q. s. for 100	q. s. for 100

Protocol for the preparation of compositions 1 to 4

Each of the compositions is prepared according to the protocol described in detail below.

1. The following are melted together: behenyl behenate, polyglyceryl-10 laurate, dicaprylyl carbonate and, if present, shea butter;

2. Water is added;

3. The combined mixture is emulsified with a rotor-stator system of the VMI brand (Rotor TT four-bladed D45 H30 and also a toothed rotor D45 H30 coupled to a grooved stator D45) rotating at 5000 rev/min for 10 minutes;

4. The emulsified system is cooled;

5. Glycerol, chlorphenesin, carbomer, xanthan gum, biosaccharide gum-1, caprylyl glycol and isononyl isononanoate are added; and, if present, tocopherol, citric acid and phenoxyethanol;

6. Once homogenized, sodium hydroxide is added;

7. When the mixture passes below 30°C, alcohol is added; and

8. The mixture is emptied.

Evaluation of the properties of compositions 1 to 4

Each of the compositions is characterized by its haze and transmission values, according to the protocol described above in the Materials and methods chapter, and the values measured are reported in the table below.

[Table 2]

	Haze (%)	Transmission (%)
Composition 1	97.6	94.4
Composition 2	98.3	94.1
Composition 3	99.2	94.7
Composition 4	95.9	92.5

It can thus be noted that the haze and transmission values are far greater than 90%, which respectively characterizes a soft-focus effect and a translucent effect for each of the compositions.

Claims

1. Composition, in particular a cosmetic composition, especially for caring for and/or making up keratin materials, more particularly the skin and/or lips, comprising at least:

- microparticles comprising at least one linear fatty acid monoester crystallized in the form of an Lβ lamellar phase and of the formula (I):

R_1-O-R_2 (I)

in which R_1 and R_2 are linear and saturated and have, independently of each other, a number of carbon atoms of greater than or equal to 16, with R_1 representing an acyl radical and R_2 representing an alkyl radical,

- at least one polyglycerolated nonionic surfactant of a fatty acid having at least 10 carbon atoms and comprising at least 6 glycerol units, said surfactant being chosen from polyglycerolated linear fatty acid monoesters, polyglycerolated linear fatty acid diesters and their mixtures, and

- water.

2. Composition according to the preceding claim, in which said microparticles have a number-average particle size D50 ranging from 0.5 μm to 15 μm, preferably from 3 μm to 10 μm.

3. Composition according to either of Claims 1 and 2, in which said microparticles comprise at least 30% by weight, in particular at least 50% by weight, better still at least 60% by weight, of one or more fatty acid monoesters crystallized in the form of an Lβ lamellar phase, with respect to their particulate weight.

4. Composition according to any one of the preceding claims, in which said microparticles consist of one or more fatty acid monoesters crystallized in the form of an Lβ lamellar phase.

5. Composition according to any one of the preceding claims, in which said Lβ lamellar phase is orthorhombic.

6. Composition according to any one of the preceding claims, in which said fatty acid monoester(s) crystallized in the form of an Lβ lamellar phase exhibits a melting point of greater than or equal to 50°C.

7. Composition according to any one of the preceding claims, in which R_1 and R_2 are respectively acyl and alkyl radicals having a number of carbon atoms varying from 16 to 22, preferably from 18 to 22 and more preferentially from 20 to 22.

8. Composition according to any one of the preceding claims, in which R_1 and R_2 are respectively acyl and alkyl radicals having the same number of carbon atoms.

9. Composition according to any one of the preceding claims, in which said fatty acid monoester(s) crystallized in the form of an Lβ lamellar phase is (are) chosen from behenyl behenate, arachidyl arachidate, stearyl stearate and their mixtures, preferably comprises at least behenyl behenate.

10. Composition according to any one of the preceding claims, comprising at least 3% by weight, preferably at least 5% by weight and more preferentially at least 10% by weight of fatty acid monoester(s) crystallized in the form of an Lβ lamellar phase, with respect to the total weight of said composition.

11. Composition according to any one of the preceding claims, in which said polyglycerolated surfactant comprises between 10 and 14 glycerol units.

12. Composition according to any one of the preceding claims, in which said surfactant is chosen from the esters resulting from the reaction of polyglycerol comprising from 8 to 14 glycerol units, preferably from 10 to 14 glycerol units, and of at least one fatty acid comprising from 10 to 16 carbon atoms, preferably from 12 to 14 carbon atoms, and more preferentially said surfactant comprises at least polyglyceryl-10 laurate.

13. Composition according to any one of the preceding claims, comprising at least 0.5% by weight, preferably from 1% to 7% by weight, of polyglycerolated surfactant(s), with respect to the total weight of said composition.

14. Composition according to any one of the preceding claims, in which said microparticles additionally contain at least one nonvolatile hydrocarbon oil within the Lβ lamellar phase.

15. Composition according to Claim 14, comprising at least 1.25% by weight, preferably from 2.5% to 7% by weight, of nonvolatile hydrocarbon oil(s), with respect to its total weight.

16. Composition according to either one of Claims 14 and 15, in which said nonvolatile hydrocarbon oil is chosen from dialkyl carbonates in C_{15} to C_{18} and their mixtures, and preferably is at least dicaprylyl carbonate.

17. Composition according to any one of the preceding claims, additionally comprising at least one pasty compound chosen from the esters of an oligomeric glycerol, dimer diol and dimer diacid esters, if appropriate esterified on their free alcohol or acid functional group(s) by acid or alcohol radicals, butters of vegetable origin and their mixtures, preferably at least shea butter, in particular in a proportion of at least 2% by weight, in particular from 3% to 8% by weight, with respect to the total weight of said composition.

18. Composition according to any one of the preceding claims, containing said microparticles in aqueous dispersion.

19. Composition according to any one of the preceding claims, being in the form of a makeup composition for the lips and/or skin, or of a care composition for the skin and/or lips.

20. Cosmetic treatment method, in particular a method for making up and/or caring for keratin materials, in particular the skin and/or the lips, comprising at least one step consisting in applying, to said keratin material, a composition as defined according to any one of Claims 1 to 19.

21. Process for the preparation of microparticles comprising at least one linear fatty acid monoester crystallized in the form of an Lβ lamellar phase, comprising at least the steps consisting in:

(a) providing a mixture containing at least:

- in the molten state, at least one linear fatty acid monoester of the formula (I):

R_1-O-R_2 (I)

in which:

R_1 and R_2 are linear and saturated and have, independently of each other, a number of carbon atoms of greater than or equal to 16, with R_1 representing an acyl radical and R_2 representing an alkyl radical,

- at least one polyglycerolated nonionic surfactant of fatty acid having at least 10 carbon atoms and comprising at least 6 glycerol units, said surfactant being chosen from polyglycerolated and linear monoesters of fatty acid, polyglycerolated and linear diesters of fatty acid and their mixtures, and

- water,

(b) forming an oil-in-water emulsion in which said fatty acid monoester of formula (I) is dispersed in the state of droplets,

(c) cooling said emulsion in order to transform said droplets to the state of microparticles comprising at least said fatty acid monoester of formula (I) crystallized in the form of an Lβ lamellar phase, which is in particular orthorhombic, and

(d) if appropriate, recovering said microparticles.

22. Process according to the preceding claim, in which the mixture of step (a) comprises at least one fatty acid monoester of formula (I) as defined according to any one of Claims 6 to 9, said linear fatty acid monoester(s) preferably being at a content ranging from 20% to 40% by weight, with respect to the total weight of said mixture.

23. Process according to either of Claims 21 and 22, in which the mixture of step (a) comprises at least one polyglycerolated surfactant as defined according to either of Claims 11 and 12, said surfactant(s) preferably being at a content ranging from 2% to 3.5%, with respect to the total weight of said mixture.

24. Process according to any one of Claims 21 to 23, in which the mixture of step (a) additionally comprises at least one nonvolatile hydrocarbon oil, especially as defined in Claim 16, more particularly dicaprylyl carbonate, in particular at a content ranging from 5% to 15% by weight, with respect to the total weight of said mixture.

25. Cosmetic use of the microparticles obtained by the process according to any one of Claims 21 to 24.

26. Use according to the preceding claim, employing said microparticles as fillers having a soft-focus effect.

27. Composition, in particular a cosmetic composition, especially for caring for and/or making up keratin materials, more particularly the skin and/or lips, comprising at least microparticles obtained by the process according to any one of Claims 21 to 24.

28. Composition according to the preceding claim, said composition being as defined according any one of Claims 1 to 19.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2021/085875

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61K8/02 A61K8/37 A61K8/39 A61Q1/02
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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/017239 A1 (VILADOT PETIT JOSEP LLUIS [ES] ET AL) 17 January 2013 (2013-01-17) examples 1-3, 8c, 10g	1-28
X	US 2010/003205 A1 (ELLIOTT RUSSELL PHILLIP [GB] ET AL) 7 January 2010 (2010-01-07) examples 6-10	1-28
X	US 2016/265162 A1 (KERN HOLGER [DE] ET AL) 15 September 2016 (2016-09-15) paragraphs [0033] - [0041]	1-28
X	US 2007/269470 A1 (TAKEDA KYOICHI [JP] ET AL) 22 November 2007 (2007-11-22) example 21	1-19, 21-24, 27,28

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

[X] See patent family annex.

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"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

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Date of the actual completion of the international search	Date of mailing of the international search report
14 March 2022	04/04/2022

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2021/085875

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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X	DA ROCHA-FILHO PEDRO ET AL: "Liquid Crystal Formation from Sunflower Oil: Long Term Stability Studies", MOLECULES, vol. 21, no. 6, 9 June 2016 (2016-06-09), page 680, XP055825420, DOI: 10.3390/molecules21060680 Retrieved from the Internet: URL:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6272883/pdf/molecules-21-00680.pdf> Abstract; page 7, paragraph 4	27
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