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(54) **Title:** COMPOSITION FOR WHITENING AND/OR BRIGHTENING KERATIN MATERIALS

(57) **Abstract:** Provided is a composition for whitening and/or brightening keratin materials comprising: (i) polydatin; (ii) at least one of a) and b) : a) benzylidene camphor derivative; b) at least two combination of b1) mangiferin, b2) niacinamide or derivative thereof and b3) a4-hydrobenzylidene malonate derivative; wherein the amount of UV-filter, if presents, is no more than 0.5 wt. %, relative to the total weight of the composition. Provided is also a cosmetic process for whitening and/or brightening keratin materials, in particular the human skin.

# COMPOSITION FOR WHITENING AND/OR BRIGHTENING KERATIN MATERIALS

## TECHNICAL FIELD

The present invention relates to a cosmetic composition. In particular, the present invention relates to a composition for whitening and /or brightening keratin materials, in particular human skin.

## BACKGROUND ART

Human skin colour depends on various factors, and in particular on the seasons of the year, on race and on gender; it is mainly determined by the nature and the concentration of melanin produced by melanocytes. Melanocytes are specialized cells which synthesize melanin by means of specific organelles, melanosomes.

With aging, the outer skin layer (epidermis) thins, even though the number of cell layers remains unchanged. The number of pigment-containing cells (melanocytes), however, decreases. Therefore, the skin appears pale and translucent. Large pigmented spots (age spots, liver spots, or lentigos) may appear in sun-exposed areas. Changes in the connective tissue reduce the skin's strength and elasticity. It is more noticeable in sun-exposed areas (solar elastosis). Elastosis produces the leathery, weather-beaten appearance common to farmers, sailors, and others who spend a large amount of time outdoors. Dehydration increases the risk of skin injury. Poor nutrition can also negatively impact the skin, causing dryness, rash, and puffiness.

Oxidative stress causes an increase in inflammation, a decrease in collagen levels, overexpression of the enzyme MMP, an increase in protein glycation, and an increase in mitochondrial decay throughout the skin. Additional aging processes include the intrinsic rate of proton leakage across the inner mitochondrial membrane, decreased membrane fluidity, and decreased levels and function of cardiolipin. The mitochondria, which create the energy the cells need by converting dietary and other cellular fuels into ATP, are adversely affected by these aging processes. It has been shown that oxidants generated by mitochondria are the major source of the oxidative lesions in the mitochondria that accumulate with age. In older skin, the mitochondria become severely impaired, and this leads to both a decrease in ATP production and greater oxidative damage.

Antioxidants are useful agents treating the skin from damage caused by chronoaging and photoaging. Useful antioxidants include those that provide the highest capacity to absorb free radicals, for example, polydatin. It is an antioxidant

that is beneficial to the skin. For example, it imparts anti-inflammation and photoprotective properties, which help the skin maintain a healthy, youthful, and radiant appearance. The cosmetic use of polydatin, however, has been limited due to its photo-instability. Trans-polydatin will isomerize into cis-polydatin and THP (trihydroxyphenanthrene) when being exposed in sunlight, cis-polydatin has less biological activity and THP has toxic effect.

Some commercial products contain higher amount of ultraviolet filters to protect polydatin from sun lights. There is no disclosure on stable products containing polydatin without a higher amount of ultraviolet filters.

**SUMMARY OF THE INVENTION**

An object of the present application is to develop a stable product containing polydatin without a higher amount of ultraviolet filters.

Thus, according to one aspect, the present invention relates to a composition for whitening and /or brightening keratin materials comprising:

(i) polydatin;

(ii) at least one of a) and b):

a) benzylidene camphor derivative;

b) at least two combination of b1) mangiferin, b2) niacinamide or derivative thereof and b3) a 4-hydrobenzylidene malonate derivative;

wherein the amount of UV-filter, if presents, is no more than 0.5 wt.%, relative to the total weight of the composition.

The composition according to the present invention is a non-UV composition.

The composition according to the present invention is advantageous in several respects.

Firstly, the composition according to the present invention has whitening and /or brightening effect to keratin materials, in particular human skin.

In addition, the composition of the present invention is stable under sun-light and over time.

In the present application, the stability is evaluated by testing the degradation of trans-polydatin. The composition will be considered as stable when the degradation of trans-polydatin is not less than 50 wt.% after being exposed to UVA of 10 J/cm$^2$.

According to another aspect, the present invention also relates to a cosmetic process for whitening and /or brightening keratin materials, in particular human skin,

comprising the step of applying the composition according to the present invention on the keratin materials.

Other subjects and characteristics, aspects and advantages of the invention will emerge even more clearly on reading the description and the examples that follow.

## DETAILED DESCRIPTION OF THE INVENTION

In that which follows and unless otherwise indicated, the limits of a range of values are included within this range, in particular in the expressions "between...and..." and "ranging from ... to ...".

For the purposes of the present invention, the term “keratin material” is intended to cover human skin, mucous membranes such as the lips. Facial skin is most particularly considered according to the present invention.

Moreover, the expression "at least one" used in the present description is equivalent to the expression "one or more".

Unless otherwise specified, all numerical values expressing amount of ingredients and the like which are used in the description and claims are to be understood as being modified by the term “about”. Accordingly, unless indicated to the contrary, the numerical values and parameters described herein are approximate values which are capable of being changed according to the desired purpose as required.

Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by those skilled in the art the present invention belongs to. When the definition of a term in the present description conflicts with the meaning as commonly understood by those skilled in the art the present invention belongs to, the definition described herein shall apply.

All percentages in the present application refer to weight percentage, unless otherwise specified.

Throughout the instant application, the term “comprising” is to be interpreted as encompassing all specifically mentioned features as well optional, additional, unspecified ones.

As used herein, the use of the term “comprising” also discloses the embodiment wherein no features other than the specifically mentioned features are present (*i.e.* “consisting of”).

As used herein, the term "non-UV composition" means the amount of UV filter(s) in the composition, if any, is no more than 0.5 wt.%, relative to the total weight of the composition.

According to one aspect, the present invention relates to a composition for whitening and /or brightening keratin materials comprising:

(i) polydatin;

(ii) at least one of a) and b):

a) benzylidene camphor derivative;

b) at least two of b1) mangiferin, b2) niacinamide or derivative thereof and b3) a 4-hydrobenzylidene malonate derivative;

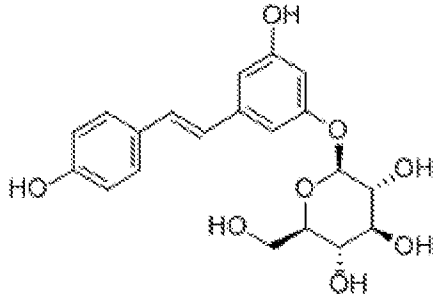
wherein the amount of UV-filter, if presents, is no more than 0.5 wt.%, relative to the total weight of the composition.

**Polydatin**

The composition of the present invention comprises polydatin.

Polydatin is a polyphenol belonging to the chemical family of stilbenoids, which is also called piceid. Polydatin can be extracted from the root and rhizome of *Polygonum cuspidatum* and it can also be found in a variety of other sources, such as grape, peanut, hop cones, red wines, hop pellets, cocoa-containing products, chocolate products and many daily diets. Biochemical analysis revealed that polydatin decreased the production of malondialdehyde (MDA) and significantly increased superoxide dismutase and catalase activities. Additionally, PD effectively alleviated the injuries of cultured neurons induced by oxygen-glucose deprivation.

Trans-polydatin will isomerize into cis-polydatin and cis-polydatin can further be converted into THP when being exposed in sun light, cis-polydatin has less biological activity and THP has toxic effect. Trans-polydatin is 3, 4', 5-trihydroxystibene-3-β-mono-D glucoside, a stilbenoid that is trans-resveratrol substituted at position 3 by a β-D-glucosyl residue, and has the following structure:



As examples of commercial products, mention can be made of that sold under the name POLYGONUM CUSPIDATUM ROOT EXTRACT by the company GUILIN LAYN NATURAL INGREDIENTS.

Advantageously, polydatin is present in amount ranging from 0.01 wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.%, more preferably from 0.1 wt.% to 1 wt.%, relative to the total weight of the composition.

**Benzylidene camphor derivatives**

The composition of the present invention may comprise a benzylidene camphor derivative. One or more benzylidene camphor derivatives may be used in the composition of the invention. Thus, a single benzylidene camphor derivative or a combination of different benzylidene camphor derivatives may be used.

As examples of benzylidene camphor derivatives, mention can be made of:

3-benzylidene camphor, for example, that sold under the trademark “Mexoryl SD” by Chimex;

4-methylbenzylidene camphor, for example, that sold under the trademark “Eusolex 6300” by Merck;

benzylidene camphor sulfonic acid, for example, that sold under the trademark “Mexoryl SL” by Chimex;

camphor benzalkonium methosulfate, for example, that sold under the trademark “Mexoryl SO” by Chimex;

terephthalylidene dicamphor sulfonic acid, for example, that sold under the trademark “Mexoryl SX” by Chimex; and

polyacrylamidomethyl benzylidene camphor, for example, that sold under the trademark “Mexoryl SW” by Chimex.

In some embodiments, the composition according to the present invention comprises at least one benzylidene camphor derivative selected from 3-benzylidene camphor, 4-methylbenzylidene camphor, benzylidene camphor sulfonic acid, camphor benzalkonium methosulfate, terephthalylidene dicamphor sulfonic acid, and polyacrylamidomethyl benzylidene camphor.

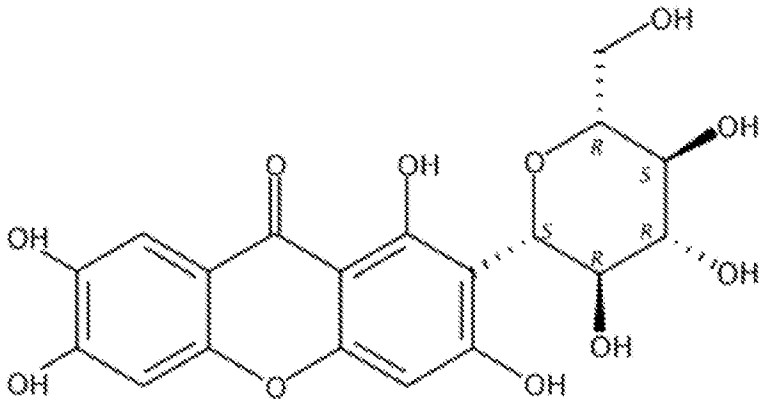
In some embodiments, the composition according to the present invention comprises terephthalylidene dicamphor sulfonic acid.

If presents, the benzylidene camphor derivative is present in the composition of the invention in an amount of from 0.1 wt.% to 0.5 wt.%, preferably from 0.15 wt.%

to 0.5 wt.% and more preferably from 0.2 wt.% to 0.5 wt.%, relative to the total weight of the composition.

**Mangiferin**

The composition of the present invention may comprise mangiferin.




Mangiferin ($C_{19}H_{18}O_{11}$, CAS: 4773-96-0, $M_W$ = 422.33962)

Mangiferin, a glucosyl xanthone polyphenolic antioxidant, has been demonstrated to have a variety of beneficial properties for cosmetic and therapeutic applications, including, anti-lipid peroxidation, antimicrobial, immunomodulation, cardiotonic, hypotensive, wound healing, antidegenerative and antidiabetic activities.

Mangiferin can be available as an isolate or extract comprising mangiferin, for example, as a mango leaf extract.

Mango leaf extract may be obtained containing mangiferin in amounts from less than 70% and up to 99% or greater. More generally, other isolates and extracts can be obtained that contain mangiferin up to 100% in purity. Thus, it will be appreciated that the term "an isolate or extract comprising mangiferin up to 100% in purity" means and includes, but is not limited to, mango leaf extract.

As used herein, mango leaf extract includes an extract consisting of 100% mangiferin, as well as extracts comprising from less than 70% mangiferin to up to 99% mangiferin.

In some embodiments, mango leaf extract may include mangiferin present at 70%, the remainder of the extract comprising other components. Thus, in the various embodiments as disclosed herein, the amount of mangiferin present in the composition according to the present invention can be determined as the product of the weight percent of the mango leaf extract or other isolate or extract reagent used in the formulation and the percentage of mangiferin in the selected reagent. Thus, for example, a composition comprising 0.5% mango leaf extract prepared with an extract

that comprises 70% mangiferin, would comprise about 0.35% mangiferin together with other components of the mango leaf extract.

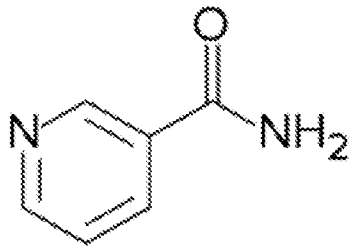
In some embodiments, mangiferin is provided having purity from less than 70% and up to greater than 99%, alone or together with other components, for example, in isolates or extracts from sources other than mango leaf. It will be appreciated that compositions according to the invention may comprise mango leaf extract or other isolates or extracts containing mangiferin. Thus, in another example, a composition comprising 1 % of an isolate or other extract prepared with a material that comprises 100% mangiferin, would comprise about 1 % mangiferin essentially free from other components in the isolate or extract.

If presents, mangiferin is present in the composition of the invention in an amount of from 0.01 wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.% and more preferably from 0.1 wt.% to 2 wt.%, relative to the total weight of the composition.

**Nicotinamide or derivatives thereof**

The composition of the present invention may comprise nicotinamide or derivative thereof.

Nicotinamide, also called Vitamin B3, is a compound of the following formula:




Nicotinamide derivatives that may be mentioned include, for example, nicotinic acid, nicotinyl alcohol, nicotinuric acid, niconityl hydroxamic acid, nicotinic acid esters such as tocopherol nicotinate, amides derived from nicotinamide by substitution of the hydrogen of $-CONH_2$, products from reaction with carboxylic acids and amino acids, esters of nicotinyl alcohol and of carboxylic acids such as acetic acid, salicyclic acid, glycolid acid or palmitic acid.

Mention may also be made of the following derivatives: 2-chloronicotinamide, 6-methylnicotinamide, 6-aminonicotinamide, N-methylnicotinamide, N,N-dimethylnicotinamide, N-(hydroxymethyl)nicotinamide, quinolinic acid imide, nicotinanilide, N-benzylnicotinamide, N-ethylnicotinamide, nifenazone, nicotinaldehyde, isonicotinic acid, methylisonicotinic acid, thionicotinamide,

nialamide, 2-mercaptonicotinic acid, nicomol and niaprazine, methyl nicotinate and sodium nicotinate.

If presents, nicotinamide or derivative thereof is present in the composition of the invention in an amount of from 0.1 wt.% to 10 wt.%, preferably from 1 wt.% to 8 wt.% and more preferably from 3 wt.% to 6 wt.%, relative to the total weight of the composition.

In some embodiments, the composition comprises mangiferin and at least one nicotinamide or dderivative thereof.

In some embodiments, the composition comprises mangiferin and at least one nicotinamide or derivative thereof selected from 2-chloronicotinamide, 6-methylnicotinamide, 6-aminonicotinamide, N-methylnicotinamide, N,N-dimethylnicotinamide, N-(hydroxymethyl)nicotinamide, quinolinic acid imide, nicotinanilide, N-benzylnicotinamide, N-ethylnicotinamide, nifenazone, nicotinaldehyde, isonicotinic acid, methylisonicotinic acid, thionicotinamide, nialamide, 2-mercaptonicotinic acid, nicomol, niaprazine, methyl nicotinate, sodium nicotinate, niacinamide, 2-chloronicotinamide, 6-methylnicotinamide, 6-aminonicotinamide, N-methylnicotinamide, N,N-dimethylnicotinamide, N-(hydroxymethyl)nicotinamide, N-benzylnicotinamide, N-ethylnicotinamide, and thionicotinamide.

In some embodiments, the composition according to the present invention comprises mangiferin and at least one nicotinamide or derivative thereof selected from niacinamide, 2-chloronicotinamide, 6-methylnicotinamide, 6-aminonicotinamide, N-methylnicotinamide, N,N-dimethylnicotinamide, N-(hydroxymethyl)nicotinamide, N-benzylnicotinamide, N-ethylnicotinamide, and thionicotinamide.

In some embodiments, the composition according to the present invention comprises mangiferin and niacinamide.

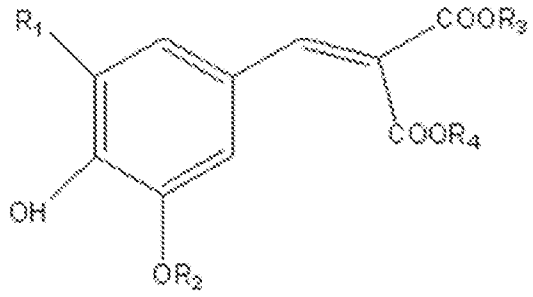
According to a preferred embodiment, mangiferin is present in the composition of the invention in an amount of from 0.01 wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.% and more preferably from 0.1 wt.% to 2 wt.%, the nicotinamide or derivative thereof is present in the composition of the invention in an amount of from 0.1 wt.% to 10 wt.%, preferably from 1 wt.% to 8 wt.% and more preferably from 3 wt.% to 6 wt.%, relative to the total weight of the composition.

**4-hydrobenzylidene malonate derivatives**

The composition of the present invention may comprise a 4-hydrobenzylidene

malonate derivative.

Among the 4-hydroxybenzylidene malonate derivatives that are suitable for use according to the invention, use will preferentially be made of those of formula (I) below, and also the tautomeric forms thereof, the optical isomers thereof, the geometric isomers thereof; and mixtures thereof:

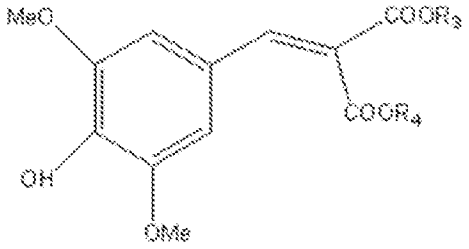



(I)

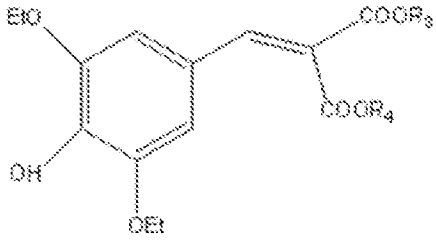
in which:

- $R_1$ represents a hydrogen atom, a linear or branched $C_1$-$C_8$ alkyl radical, or a linear or branched $C_1$-$C_8$ alkoxy radical;
- $R_2$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical;
- $R_3$ represents a hydrogen atom or a linear or branched $C_1$-$C_{30}$ alkyl radical; and
- $R_4$ represents a hydrogen atom or a linear or branched $C_1$-$C_{30}$ alkyl radical.

Among these compounds, use will more preferentially be made of those of formula (II) or (III) below, and also the tautomeric forms thereof, the optical isomers thereof, the geometric isomers thereof; and mixtures thereof:




(II)

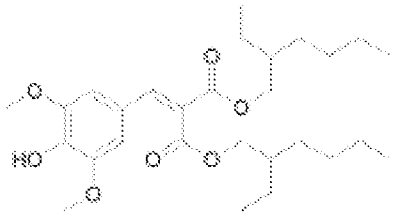



(III)

in which:

- $R_3$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical; and
- $R_4$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical.

Use will preferably be made of the compound diethylhexyl syringylidenemalonate (INCI name: diethylhexyl syringylidenemalonate) of formula (IV) below, and also the tautomeric forms thereof, the optical isomers thereof, and mixtures thereof:



(IV)

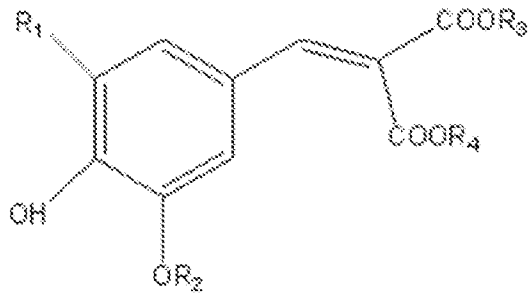
Such a compound is sold especially under the trade name Oxynex ST by the company Merck.

According to a particularly preferred embodiment, the 4-hydrobenzylidene malonate derivative is diethylhexyl syringylidenemalonate (INCI name: diethylhexyl syringylidenemalonate).

If presents, the 4-hydrobenzylidene malonate derivative is present in the composition of the invention in an amount from 0.1 wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.% and more preferably from 0.5wt.% to 3 wt.%, relative to the total weight of the composition.

In some embodiments, the composition according to the present invention comprises mangiferin and a 4-hydrobenzyl malonate derivative.

In some embodiments, the composition according to the present invention comprises mangiferin and a 4-hydrobenzyl malonate derivative selected from those of formula (I) below, and also the tautomeric forms thereof, the optical isomers thereof, the geometric isomers thereof; and mixtures thereof:



(I)

in which:

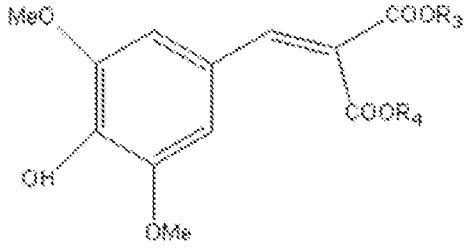
- $R_1$ represents a hydrogen atom, a linear or branched $C_1$-$C_8$ alkyl radical, or a linear or branched $C_1$-$C_8$ alkoxy radical;

- $R_2$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical;

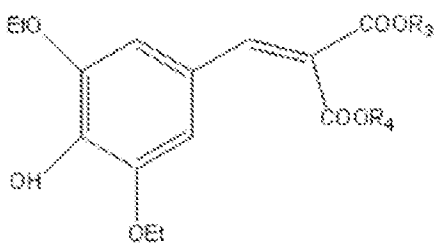
- $R_3$ represents a hydrogen atom or a linear or branched $C_1$-$C_{30}$ alkyl radical; and

- $R_4$ represents a hydrogen atom or a linear or branched $C_1$-$C_{30}$ alkyl radical.

In some embodiments, the composition according to the present invention comprises mangiferin and a 4-hydrobenzyl malonate derivative selected from those of formula (II) or (III) below, and also the tautomeric forms thereof, the optical isomers thereof, the geometric isomers thereof; and mixtures thereof:




(II)




(III)

in which:

- $R_3$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical; and
- $R_4$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical.

In some embodiments, the composition according to the present invention comprises mangiferin and diethylhexyl syringylidenemalonate.

In some embodiments, the composition according to the present invention comprises nicotinamide or derivative thereof and diethylhexyl syringylidenemalonate.

According to a preferred embodiment, mangiferin is present in the composition of the invention in an amount of from 0.01 wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.% and more preferably from 0.1 wt.% to 2 wt.%, the 4-hydrobenzyl malonate derivative is present in the composition of the invention in an amount of from 0.1 wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.% and more preferably from 0.5 wt.% to 3 wt.%, relative to the total weight of the composition.

According to a preferred embodiment, nicotinamide or derivative thereof is present in the composition of the invention in an amount of from 0.1 wt.% to 10 wt.%, preferably from 1 wt.% to 8 wt.% and more preferably from 3 wt.% to 6 wt.%, the 4-hydrobenzyl malonate derivative is present in the composition of the invention in an amount of from 0.1 wt.% to 10 wt.%, preferably from 0.1wt.% to 5 wt.% and more preferably from 0.5wt.% to 3 wt.%, relative to the total weight of the composition.

**Aqueous phase**

The composition of the present invention comprises at least one aqueous phase.

The aqueous phase of the composition according to the present invention comprises water and optionally one or more water-miscible or at least partially water-miscible compounds, for instance $C_2$ to $C_8$ lower polyols or monoalcohols, such

as ethanol and isopropanol.

The term "*polyol*" should be understood as meaning any organic molecule comprising at least two free hydroxyl groups. Examples of polyols that may be mentioned include glycols, for instance butylene glycol, propylene glycol, and isoprene glycol, caprylyl glycol, glycerol (i.e. glycerin) and polyethylene glycols.

The aqueous phase may also comprise any common water-soluble or water-dispersible additive as mentioned below.

The aqueous phase may represent from 30 wt.% to 98 wt.%, preferably from 50 wt.% to 90 wt.%, and more preferably from 50 wt.% to 85 wt.%, relative to the total weight of the composition.

**Oily phase**

The composition according to this invention comprises at least one oily phase comprising an oil.

Preferably, the oily phase is dispersed oily phase.

The term "oil" refers to any fatty body in liquid form at room temperature (20-25°C) and atmospheric pressure. These oils may be of animal, plant, mineral or synthetic origin.

The oils may be volatile or non-volatile.

The term "volatile oil" refers to any non-aqueous medium capable of evaporating from the skin or lips, in less than one hour, at room temperature (20-25°C) and atmospheric pressure (760 mmHg). The volatile oil is a volatile cosmetic oil, liquid at room temperature. More specifically, a volatile oil has an evaporation rate of between 0.01 and 200mg/cm$^2$/min, inclusive.

The term "non-volatile oil" is intended to mean an oil remaining on the skin or lips at ambient temperature and atmospheric pressure. More specifically, a non-volatile oil has an evaporation rate strictly below 0.01 mg/cm$^2$/min.

To measure this evaporation rate, 15g of oil or a mixture of oils to be tested are introduced into a crystallizer, 7cm in diameter, placed on a scale located in a large 0.3m$^3$ chamber temperature-controlled at a temperature of 25°C, and humidity-controlled with a relative humidity of 50%. The liquid is left to evaporate freely, without stirring, by providing ventilation with a fan (PAPST-MOTOREN, reference 8550 N, rotating at 2700 rpm) positioned vertically above the crystallizer containing the solvent, with the blades directed toward the crystallizer and at a distance of 20cm from the base of the crystallizer. The mass of oil remaining in the crystallizer is

measured at regular intervals. The evaporation rates are expressed in mg of oil evaporated per surface area unit ($cm^2$) and per time unit (minute).

The oils that are suitable for the present invention may be hydrocarbon-based, silicone-based or fluorine-based.

According to the invention, the term "silicone oil" refers to an oil including at least one silicon atom, and in particular at least on Si-O group.

The term "fluorine oil" refers to an oil including at least one fluorine atom.

The term "hydrocarbon oil" refers to an oil containing primarily hydrogen and carbon atoms.

The oils may optionally include oxygen, nitrogen, sulfur and/or phosphorus atoms, for example, in the form of hydroxyl or acid radicals.

Preferably, the oily phase is present in an amount of less than 50 wt.%, preferably from 0.1 wt.% to 40 wt.%, more preferably from 1 wt.% to 30 wt.%, relative to the total weight of the composition.

**Additives**

In a known manner, the composition of the present invention may also contain one or more additives that are common in cosmetics or dermatology.

Examples of adjuvants that may be mentioned include gelling agents, active agents, preserving agents, fragrances, basic agents (triethanolamine, diethanolamine or sodium hydroxide), and mixtures thereof.

These additives are used in the usual proportions in the cosmetics field, for example from 0.01% to 30% of the total weight of the composition, and, depending on their nature, they are introduced into the aqueous phase of the composition or into the oily phase, or alternatively into vesicles or any other type of vector.

These additives and the concentrations thereof must be such that they do not modify the desired properties for the composition of the present invention.

In a preferred embodiment, the present invention provides a composition for whitening and /or brightening keratin materials comprising, relative to the total weight of the composition:

(i) from 0.1wt.% to 1 wt.% of polydatin; and

(ii) from 0.2 wt.% to 0.5 wt.% of benzylidene camphor derivative selected from 3-benzylidene camphor, 4-methylbenzylidene camphor, benzylidene camphor

sulfonic acid, camphor benzalkonium methosulfate, terephthalylidene dicamphor sulfonic acid, and polyacrylamidomethyl benzylidene camphor;

wherein the amount of UV-filter is no more than 0.5 wt.%, relative to the total weight of the composition.

In a preferred embodiment, the present invention provides a composition for whitening and /or brightening keratin materials comprising, relative to the total weight of the composition:

(i) from 0.1 wt.% to 1 wt.% of polydatin; and

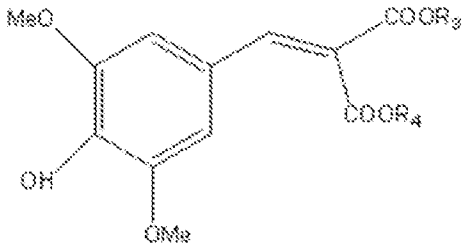
(ii) from 0.1 wt.% to 2 wt.% of mangiferin and from 3 wt.% to 6 wt.% of at least one compound selected from niacinamide, 2-chloronicotinamide, 6-methylnicotinamide, 6-aminonicotinamide, N-methylnicotinamide, N,N-dimethylnicotinamide, N-(hydroxymethyl)nicotinamide, N-benzylnicotinamide, N-ethylnicotinamide, and thionicotinamide,

wherein the amount of UV-filter, if presents, is no more than 0.5 wt.%, relative to the total weight of the composition.

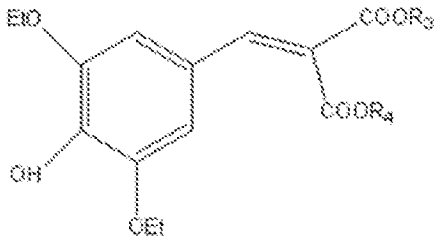
In a preferred embodiment, the present invention provides a composition for whitening and /or brightening keratin materials comprising, relative to the total weight of the composition:

(i) from 0.1 wt.% to 1 wt.% of polydatin; and

(ii) from 0.1 wt.% to 2 wt.% of mangiferin and from 0.5 wt.% to 3 wt.% of 4-hydrobenzylidene selected from those of formula (II) or (III) below, and also the tautomeric forms thereof, the optical isomers thereof, the geometric isomers thereof; and mixtures thereof:




(II)




(III)

in which:

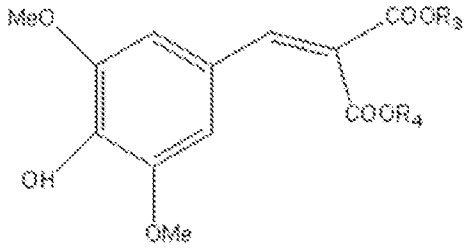
- $R_3$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical; and
- $R_4$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical;

wherein the amount of UV-filter, if presents, is no more than 0.5 wt.%, relative to the total weight of the composition.

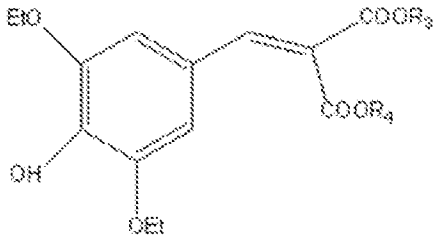
In a preferred embodiment, the present invention provides a composition for whitening and /or brightening keratin materials comprising, relative to the total weight of the composition:

(i) from 0.1 wt.% to 1 wt.% of polydatin; and

(ii) from 3 wt.% to 6 wt.% of nicotinamide and from 0.5 wt.% to 3 wt.% of 4-hydrobenzylidene selected from those of formula (II) or (III) below, and also the tautomeric forms thereof, the optical isomers thereof, the geometric isomers thereof; and mixtures thereof:




(II)




(III)

in which:

- $R_3$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical; and
- $R_4$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical;

wherein the amount of UV-filter, if presents, is no more than 0.5 wt.%, relative to the total weight of the composition.

Preferably the composition of the present invention is for example in the form of a lotion, cream, gel or liquid foundation, more preferably in the form of a gel, and they are prepared according to the conventional methods in the cosmetic field.

**Method and use**

The composition according to the present invention is intended for topical application and can especially constitute a composition intended for whitening and /or brightening keratin materials, and especially human skin.

Thus, in another aspect, the present invention relates to a cosmetic process for whitening and /or brightening keratin materials, in particular skin, comprising the step of applying the composition as defined above to the keratin materials.

The present invention is illustrated in greater detail by the examples described below, which are given as non-limiting illustrations.

The percentages are weight percentages by active ingredient, or active matters.

In the examples that follow, the weight percentages are indicated relative to the total weight of the composition.

**Examples**

Main raw materials used, trade names and supplier thereof are listed in Table 1.

Table 1

| INCL | Commercial Name | Supplier |
|---|---|---|
| POLYGONUM CUSPIDATUM ROOT EXTRACT | POLYGONUM CUSPIDATUM ROOT EXTRACT | GUILIN LAYN NATURAL INGREDIENTS |
| NIACINAMIDE | NIACINAMIDE | DSM NUTRITIONAL PRODUCTS |
| TEREPHTHALYLIDENE DICAMPHOR SULFONIC ACID | MEXORYL SX | CHIMEX (NOVEAL) |
| DIETHYLHEXYL SYRINGYLIDENEMALONATE | OXYNEX ST LIQUID | MERCK |
| MANGIFERA INDICA (MANGO) LEAF EXTRACT /MANGIFERA INDICA LEAF EXTRACT | MANGO LEAF EXTRACT 80 | GUILIN LAYN NATURAL INGREDIENTS |
| BUTYL METHOXYDIBENZOYLMETHANE | PARSOL 1789 | DSM NUTRITIONAL PRODUCTS/MFCI/MERCK/SYMRISE/CHEMSPEC CHEMICALS |
| CAPRYLIC/CAPRIC TRIGLYCERIDE | MASESTER E7000/WILFAREST ER MCT 7030/DUB MCT 7030 | PT MUSIM MAS/WILMAR/STEARINERIE DUBOIS |
| BIS-PEG/PPG-16/16 PEG/PPG-16/16 DIMETHICONE(and) CAPRYLIC/CAPRIC TRIGLYCERIDE | ABIL CARE 85 | EVONIK GOLDSCHMIDT |
| ETHYLHEXYL TRIAZONE | UVINULT150 | BASF |
| DIETHYLAMINO HYDROXYBENZOYL HEXYL BENZOATE | UVINUL A PLUS | BASF |
| BIS-ETHYLHEXYLOXYPHENOL METHOXYPHENYL TRIAZINE | TINOSORB S | BASF |
| PHENYLBENZIMIDAZOLE SULFONIC ACID | EUSOLEX 232 | MERCK |
| XANTHAN GUM | KELTROL CG-T | CP KELCO |

**Invention Example 1 and Comparative Examples 1-4**

Compositions according to invention formulas (IE.) 1 and comparative formulas (CE.) 1-4 were prepared with the ingredients listed in Table 2 (the contents are expressed as weight percentages of active material with regard to the total weight of

each composition, unless otherwise indicated):

Table 2

| Components | | Comp.1 | Comp.2 | Comp.3 | Comp.4 | Inv.1 |
|---|---|---|---|---|---|---|
| | | Wt.% | Wt.% | Wt.% | Wt.% | Wt.% |
| POLYGONUM CUSPIDATUM ROOT EXTRACT | Phase A | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| DIPROPYLENE GLYCOL | | 5 | 5 | 5 | 5 | 5 |
| PHENOXYETHANOL | | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Mexoryl SX | | - | - | - | - | 0.49 |
| WATER | | QS100 | QS100 | QS100 | QS100 | QS100 |
| CAPRYLIC/CAPRIC TRIGLYCERIDE | Phase B | 1 | 1 | 1 | 1 | 1 |
| BIS-PEG/PPG-16/16 PEG/PPG-16/16 DIMETHICONE(and) CAPRYLIC/CAPRIC TRIGLYCERIDE | | 1 | 1 | 1 | 1 | 1 |
| UVINULT150 | | 0.45 | | | | |
| UVINUL A PLUS | | | 0.45 | | | |
| TINOSORB S | | | | 0.45 | | |
| EUSOLEX 232 | | | | | 0.49 | |
| XANTHAN GUM | Phase C | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Polydatin residue | | 31% | 42% | 38% | 27% | 59% |

**Preparation process:**

The compositions were prepared as follows.

1. Adding all ingredients for phase A to a beaker, heating to 75 °C, stirring until dissolved;

2. adding Xanthan gum into phase A, until homogenized;

3. heating all ingredients for phase B to 80 °C, mixing until dissolved;

4. adding phase B into phase A, homogenized 15 minutes;

5. adding phase C, stirring until homogeneous;

6. cooling down to 28 °C.

The stability under sunlight of the compositions according to comparative formulas and invention formula were evaluated as follows.

**<u>Stability under sunlight</u>**

1. ACHIEVEMENT OF THE SPREADING OF THE FORMULA (2 to 2.1 mg/cm$^2$)

- Place the sample holder frosted face up on the weighing pan and tare.

- Place about 20 mg of the test product, with the entire width of the spreading area being 8 $cm^2$.

- Quickly spread the product with a spatula, so as to cover the region of a visually homogeneous film product.

- Check the amount of spread product: the amount remaining after plating must be between 16 mg and 17 mg, a film of about 2-2.1 $mg/cm^2$.

- For each formula, and it will be made at least eight similar plates, wherein:

Four plates were exposed to UVA (at dose 10 $J/cm^2$).

Four plates were not subject to UVA exposure, which will serve as reference.

These plates are placed in a ventilated oven at a temperature of 40°C, for a time equal to the duration of UVA exposure (corresponding to a dose of 10 $J/cm^2$).

2. EXPOSURE TO UVA RADIATION OF THE RAMP

- Put the four plates per formula exposed under UV ramp Vilber Lourmat during the time corresponding to selected dose.

The plates were arranged in the width direction to (+/- 5cm) probe sides.

- Note: a dose of 10 $J/cm^2$ corresponds to the average daily UV dose.

- After exposure, the plates were stored protected from light until the time of extraction.

The extraction was carried out quickly after exposure (maximum time one hour).

3. Determined the content by high performance liquid chromatography (HPLC).

The results were listed in Table 2.

**Invention Examples 2-4 and Comparative Examples 5**

Compositions according to invention formulas (IE.) 2-4 and comparative formulas (CE.) 5 were prepared with the ingredients listed in Table 3 (the contents are expressed as weight percentages of active material with regard to the total weight of each composition, unless otherwise indicated):

Table 3

| Components | | Comp.5 | Inv.2 | Inv.3 | Inv.4 |
|---|---|---|---|---|---|
| | | Wt.% | Wt.% | Wt.% | Wt.% |
| POLYGONUM CUSPIDATUM ROOT EXTRACT | Phase A | 0.5 | 0.5 | 0.5 | 0.5 |
| DIPROPYLENE GLYCOL | | 5 | 5 | 5 | 5 |
| PHENOXYETHANOL | | 0.5 | 0.5 | 0.5 | 0.5 |
| MAGO LEAF EXTRACT | | - | 0.35 | 0.35 | - |
| NIACINAMIDE | | - | 4 | - | 4 |
| WATER | | QS100 | QS100 | QS100 | QS100 |
| CAPRYLIC/CAPRIC TRIGLYCERIDE | Phase B | 2 | 2 | 2 | 2 |
| BIS-PEG/PPG-16/16 PEG/PPG-16/16 DIMETHICONE (and) CAPRYLIC/CAPRIC TRIGLYCERIDE | | 1 | 1 | 1 | 1 |
| DIETHYLHEXYL SYRINGYLIDENEMALNATE | | - | - | 2 | 2 |
| XANTHAN GUM | Phase C | 0.2 | 0.2 | 0.2 | 0.2 |
| Polydatin residue | | 35% | 56% | 68% | 52% |

**Preparation process:**

The compositions were prepared as follows.

1. adding all ingredients for phase A to a beaker, heating to 75°C, stirring until dissolved;

2. adding Xanthan gum into phase A, until homogenized;

3. heating all ingredients for phase B to 80 °C, mix until dissolved;

4. adding phase B into phase A, homogenized 15 minutes;

5. adding phase C, stirring until homogeneous;

6. cooling down to 28°C.

The stability under sunlight of the compositions according to comparative formulas and invention formulas were evaluated.

The results were listed in Table 3.

**CLAIMS**

1. A composition for whitening and /or brightening keratin materials comprising:

(i) polydatin;

(ii) at least one of a) and b):

a) benzylidene camphor derivative;

b) at least two of b1) mangiferin, b2) niacinamide or derivative thereof and b3) a 4-hydrobenzylidene malonate derivative;

wherein the amount of UV-filter, if presents, is no more than 0.5 wt.%, relative to the total weight of the composition.

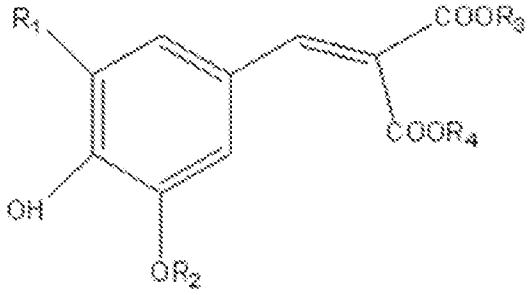
2. Composition of claim 1, wherein polydatin is present in amount ranging from 0.01wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.%, more preferably from 0.1 wt.% to 1 wt.%, relative to the total weight of the composition.

3. Composition of claim 1 or 2, wherein the composition comprises a benzylidene camphor derivative selected from 3-benzylidene camphor, 4-methylbenzylidene camphor, benzylidene camphor sulfonic acid, camphor benzalkonium methosulfate, terephthalylidene dicamphor sulfonic acid, and polyacrylamidomethyl benzylidene camphor.

4. Composition of claim 3, wherein the benzylidene camphor derivative is present in an amount of from 0.1 wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.% and more preferably from 0.2 wt.% to 1 wt.%, relative to the total weight of the composition.

5. Composition of claim 1 or 2, wherein the composition comprises at least two of b1) mangiferin , b2) niacinamide or derivative thereof and b3) a 4-hydrobenzylidene malonate derivative, wherein the nicotinamide or derivative thereof selected from 2-chloronicotinamide, 6-methylnicotinamide, 6-aminonicotinamide, N-methylnicotinamide, N,N-dimethylnicotinamide, N-(hydroxymethyl)nicotinamide, quinolinic acid imide, nicotinanilide, N-benzylnicotinamide, N-ethylnicotinamide, nifenazone, nicotinaldehyde, isonicotinic acid, methylisonicotinic acid, thionicotinamide, nialamide, 2-mercaptonicotinic acid, nicomol, niaprazine, methyl nicotinate, sodium nicotinate, niacinamide, 2-chloronicotinamide, 6-methylnicotinamide, 6-aminonicotinamide, N-methylnicotinamide, N,N-dimethylnicotinamide, N-(hydroxymethyl)nicotinamide, N-benzylnicotinamide, N-ethylnicotinamide, and thionicotinamide.

6. Composition of claim 5, wherein the 4-hydrobenzyl malonate derivative is selected from those of formula (I) below, and also the tautomeric forms thereof, the optical isomers thereof, the geometric isomers thereof; and mixtures thereof:




(I)

in which:

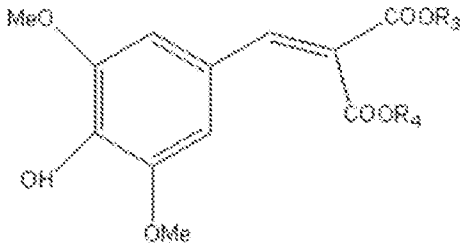
- $R_1$ represents a hydrogen atom, a linear or branched $C_1$-$C_8$ alkyl radical, or a linear or branched $C_1$-$C_8$ alkoxy radical;

- $R_2$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical;

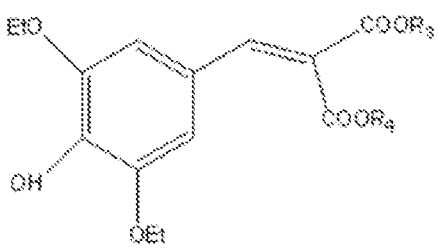
- $R_3$ represents a hydrogen atom or a linear or branched $C_1$-$C_{30}$ alkyl radical; and

- $R_4$ represents a hydrogen atom or a linear or branched $C_1$-$C_{30}$ alkyl radical.

7. Composition according to claim 5, wherein the 4-hydrobenzyl malonate derivative is selected from those of formula (II) or (III) below, and also the tautomeric forms thereof, the optical isomers thereof, the geometric isomers thereof; and mixtures thereof:




(II)




(III)

in which:

- $R_3$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical; and

- $R_4$ represents a hydrogen atom or a linear or branched $C_1$-$C_8$ alkyl radical.

8. Composition according to any of claims 5-7, wherein mangiferin is present in the composition in an amount of from 0.01 wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.% and more preferably from 0.1 wt.% to 2 wt.%, the nicotinamide or derivative thereof is present in an amount of from 0.1 wt.% to 10 wt.%, preferably from 1 wt.% to 8 wt.% and more preferably from 3 wt.% to 6 wt.%, relative to the total weight of the composition.

9. Composition according to any of claims 5-7, wherein the niacinamide or derivative thereof is present in an amount of from 0.1 wt.% to 10 wt.%, preferably from 1 wt.% to 8 wt.% and more preferably from 3 wt.% to 6 wt.%, the 4-hydrobenzyl malonate derivative is present in an amount of from 0.1 wt.% to 10 wt.%, preferably from 0.1wt.% to 5 wt.% and more preferably from 0.5wt.% to 3 wt.%, relative to the total weight of the composition.

10. Composition according to any of claims 5-7, wherein mangiferin is present in an amount of from 0.01 wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.% and more preferably from 0.1 wt.% to 2 wt.%, the 4-hydrobenzyl malonate derivative is present in an amount of from 0.1 wt.% to 10 wt.%, preferably from 0.1 wt.% to 5 wt.% and more preferably from 0.5 wt.% to 3 wt.%, relative to the total weight of the composition.

11. Composition according to any of claims 1 to 10, wherein the composition further comprises an aqueous phase in amount from 30 wt.% to 98 wt.%, preferably from 50 wt.% to 90 wt.%, and more preferably from 50 wt.% to 85 wt.%, relative to the total weight of the composition.

12. Composition according to any of claims 1 to 10, wherein the composition further comprises an oily phase in an amount of less than 50 wt.%, preferably from 0.1 wt.% to 40 wt.%, more preferably from 1 wt.% to 30 wt.%, relative to the total weight of the composition.

13. A cosmetic process for whitening and/or brightening keratin materials, in particular human skin, comprising the step of applying the composition of any one of claims 1 to 12 on the keratin materials.

# INTERNATIONAL SEARCH REPORT

International application No.
**PCT/CN2020/119268**

## A. CLASSIFICATION OF SUBJECT MATTER

A61K 8/60(2006.01)i; A61K 8/18(2006.01)i; A61Q 19/00(2006.01)i; A61P 17/18(2006.01)i

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)

A61K8/-; A61Q19/-; A61P17/-

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)

CNPAT;WPI;EPODOC;ISI Web of Knowledge;CNKI:keratin, polydatin, whiten, brighten, benzylidene camphor, mangiferin, niacinamide, 4-hydrobenzylidene malonate, UV-filter, cosmetic, skin

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | US 2018207077 A1 (L'OREAL) 26 July 2018 (2018-07-26)<br>description, paragraphs [0006] to [0019], [0033] to [0080] | 1-13 |
| X | WO 2017172519 A1 (L'OREAL et al.) 05 October 2017 (2017-10-05)<br>description, page 2, line 2 to page 3, line 4, page 3, line 17 to page 21, line 23 | 1-13 |
| X | US 2019298638 A1 (L'OREAL) 03 October 2019 (2019-10-03)<br>description, paragraphs [0006] to [0011], [0015] to [0090] | 1-13 |
| A | EP 3069763 A1 (THE BOOTS COMPANY PLC.) 21 September 2016 (2016-09-21)<br>whole document | 1-13 |

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

* Special categories of cited documents:
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"P" document published prior to the international filing date but later than the priority date claimed
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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
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| **02 June 2021** | **30 June 2021** |
| Name and mailing address of the ISA/CN<br>**National Intellectual Property Administration, PRC**<br>**6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088**<br>**China**<br>Facsimile No. **(86-10)62019451** | Authorized officer<br>**SUN,Xingchun**<br>Telephone No. **86-(10)-53962293** |

**INTERNATIONAL SEARCH REPORT**
**Information on patent family members**

International application No.
**PCT/CN2020/119268**

| Patent document cited in search report | | | Publication date (day/month/year) | Patent family member(s) | | | Publication date (day/month/year) |
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