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(54) Title: COMPOSITION FOR CONDITIONING THE HAIR

(57) Abstract: It relates to a composition for conditioning the hair comprising hydrogel capsules suspended in a liquid medium, wherein the capsules comprises: a) an inner core comprising at least one oil; and b) a hydrogel outer shell comprising water and at least one polysaccharide thickener, wherein the liquid medium is a hydroalcoholic medium. It also relates to a process for caring for the hair comprising at least a step of applying the composition onto the hair.

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COMPOSITION FOR CONDITIONING THE HAIR

TECHNICAL FIELD

The present invention belongs to the field of cosmetic product. In particular, the present invention relates to a composition for conditioning the hair. The present invention also relates to a cosmetic process for conditioning the hair.

BACKGROUND ART

The appearance and/or condition of keratin fibers are often affected by both extrinsic and intrinsic factors such as aging.

Keratin fibers, especially hair, are constantly exposed to harsh extrinsic conditions, such as sun, chemical damage, e.g., from detergents, bleaching, relaxing, dyeing, and permanent waving, heat, e.g., from hair dryers or curlers, and mechanical stress or wear, e.g., from brushing or grooming activities. In addition, any type of hair can diminish in quality and/or quantity over time by age and/or due to factors such as natural greasiness, sweat, skin cells shed from the scalp, pollution, dirt, and extreme humidity conditions.

The above-described factors can result in thinning hair and/or harm the visual appearance and the feel of the hair, and lead to lank body and decreased volume.

For example, hair can dry out and lose its shine or color or become frizzy and less manageable under low and high humidity conditions. Under low humidity conditions, hair can dry out and dried-out hair tends to be less shiny and more brittle. Conversely, under high humidity conditions, hair tends to absorb water, causing hair to lose its shape and become unmanageable and unattractive.

Furthermore, hair can lose its desirable attributes due to physical stress on the hair such as brushing and application of heat. As such, these factors generally result in damage to the keratin fibers, either by affecting protective materials on the surface of the hair (the cuticle), or by altering the hair fiber internally (the cortex).

Thus, it is highly desirable to have products providing the hair conditioning benefits.

In addition, for products for conditioning the hair, it is also desired that the products are stable over time.

Thus, there is also a need to formulate a cosmetic composition for caring for the hair, which can condition the hair and is stable over time.

SUMMARY OF THE INVENTION

An object of the present invention is thus to develop a composition for conditioning the hair, which can effectively provide the hair conditioning benefits.

Another object of the present invention is thus to develop a composition for conditioning the hair, which is stable over time and easy to use with various types of hair products such as conditioning products.

Thus, according to a first aspect, the present invention provides a composition for conditioning the hair comprising hydrogel capsules suspended in a liquid medium, wherein the capsules comprises:

- a) an inner core comprising at least one oil; and
 - b) a hydrogel outer shell comprising water and at least one polysaccharide thickener,
- wherein the liquid medium comprises is a hydroalcoholic medium.

The composition according to the present invention comprises an inner core oil phase, a hydrogel outer shell phase, and a liquid medium phase, thus it is a three-phase system, which is stable under room temperature, 4°C, and 45°C for at least 2 months.

The composition according to the present invention can provide the hair with conditioning benefits.

In addition, the compositions according to the present invention can be applied easily and uniformly on the hair, and be rinsed off easily.

According to a second aspect, the present invention provides a process for conditioning the hair comprising applying the composition as described above onto the hair.

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

DETAILED DESCRIPTION OF THE INVENTION

As used herein, unless otherwise indicated, the limits of a range of values are included within this range, in particular in the expressions "between...and..." and "from... to ...".

As used herein, the term "comprising" is to be interpreted as encompassing all specifically mentioned features as well as 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").

Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by those skilled in the field 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 field the present invention belongs to, the definition described herein shall apply.

Unless otherwise specified, all numerical values expressing amount of ingredients and the like 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 performance obtained as required.

As used herein, the expression "at least one" used in the present description is equivalent to the expression "one or more" and may be substituted for it.

According to the first aspect of the present invention, a composition for conditioning the hair comprises hydrogel capsules suspended in a liquid medium, wherein the capsules comprises:

- a) an inner core comprising at least one oil; and
- b) a hydrogel outer shell comprising water at least one polysaccharide thickener, wherein the liquid medium is a hydroalcoholic medium.

Preferably, the weight ratio of the capsules to the medium is from 10:90 to 40:60, preferably from 20:80 to 40:60.

Hydrogel capsules

As used herein, the term hydrogel capsule means beads consisting of an inner core and a hydrogel outer shell that covers and protects the core, wherein the outer shell is hydrogel.

Advantageously, the hydrogel capsules have a particle size of 0.3-15 mm, preferably 1 - 10 mm, more preferably 2-6 mm.

As used herein, particle size of the hydrogel capsules means the average diameter size thereof.

According to the first aspect, the hydrogel capsules comprise an inner core comprising at least one oil and a hydrogel outer shell comprising at least one polysaccharide thickener.

Inner core comprising at least one oil

According to the first aspect, the hydrogel capsules comprise an inner core comprising at least one oil.

Here, "oil" means a fatty compound or substance which is in the form of a liquid or a paste (non-solid) at room temperature (25°C) under atmospheric pressure (760 mmHg).

As the oil (s), those generally used in cosmetics can be used alone or in combination thereof. The oil(s) may be volatile or non-volatile, preferably non-volatile.

The oil may be a non-polar oil such as hydrocarbons, silicones, or the like; a polar oil such as esters, fatty alcohols and ethers; or a mixture thereof.

The oil may be oils of plant or animal origin and synthetic oils.

Preferably, the oil is a triglyceride oil.

Preferably, the triglyceride oil has the following formula (I):



wherein R_1 , R_2 and R_3 are independently chosen from C_6 - C_{30} alkyl and C_6 - C_{30} alkenyl.

Advantageously, in formula (I), R_1 , R_2 and R_3 are independently chosen from C_6 - C_{24} alkyl and C_6 - C_{24} alkenyl, preferably C_6 - C_{20} alkyl and C_6 - C_{20} alkenyl, more preferably C_6 - C_{14} alkyl and C_6 - C_{14} alkenyl, more preferably C_6 - C_{12} alkyl and C_6 - C_{12} alkenyl, most preferably C_6 - C_{10} alkyl and C_6 - C_{10} alkenyl, said alkyl or alkenyl is linear or branched.

In formula (I), R_1 , R_2 and R_3 may be different, or two or all of R_1 , R_2 and R_3 may be the same.

Examples of triglyceride oil according to formula (I) are given in the CTFA Cosmetic Ingredient Handbook.

Preferred triglyceride oil according to formula (I) are obtained from carboxylic acids of carbon chain length ranging from C_6 to C_{24} , preferably from C_6 to C_{20} , and more preferably from C_6 to C_{18} , linear or branched, saturated or unsaturated, and glycerol.

In some embodiments, the triglyceride oil according to formula (I) are synthetic.

In some embodiments, the triglyceride according to formula (I) are of plant origin. For example, the plant oils that comprise triglyceride according to formula (I), or triglyceride according to formula (I) obtained from the plant oils can be used.

Vegetable derived triglyceride oils according to formula (I) are particularly preferred, and specific examples of preferred materials as sources of triglyceride according to formula (I) include peanut oil, sesame oil, avocado oil, coconut oil, cocoa butter oil, almond oil, safflower oil, corn oil, cotton seed oil, olive oil, jojoba oil, palm oil, soybean oil, wheat germ oil, linseed oil, and sunflower seed oil.

Preferably, the composition according to the present invention comprises a triglyceride oil selected from peanut oil, sesame oil, avocado oil, coconut oil, cocoa butter oil, almond oil, safflower oil, corn oil, cotton seed oil, olive oil, jojoba oil, palm oil, soybean oil, wheat germ oil, linseed oil, sunflower seed oil, and a combination thereof.

More preferably, the composition according to the present invention comprises soybean oil.

Advantageously, the oil is present in the composition of the present invention in an amount ranging from 3 wt.% to 40 wt.%, more preferably from 5 wt.% to 35 wt.%, most preferably from 8 wt.% to 25 wt.%, relative to the total weight of the composition.

The core may also comprise a fragrance.

The fragrance is not particularly limited.

The skilled in the art can adjust the amount of the fragrance through conventional means.

Hydrogel outer shell comprising water and at least one polysaccharide thickener

According to the first aspect, the composition according to the invention comprises water and at least one polysaccharide thickener.

Advantageously, the outer shell has a thickness of 0.1-2 μm , preferably 0.1-1.5 μm .

For the purposes of the present invention, the term "polysaccharides" is intended to mean a polymer constituted of sugar units.

For the purposes of the present invention, the term "sugar unit" is intended to mean an oxygen-bearing hydrocarbon-based compound containing several alcohol functions, with or without aldehyde or ketone functions, and which comprises at least 4 carbon atoms.

The sugar units may be optionally modified by substitution, and/or by oxidation and/or by dehydration.

The sugar units that may be included in the polysaccharide thickener of the present invention are preferably derived from one or more of the following sugars: glucose, galactose, arabinose, rhamnose, mannose, xylose, fucose, anhydrogalactose, galacturonic acid, glucuronic acid, mannuronic acid, galactose sulfate, anhydrogalactose sulfate and fructose.

Mention may in particular be made, by way of polysaccharides, of native gums such as:

a) tree or shrub exudates, including:

- gum arabic (branched polymer of galactose, arabinose, rhamnose and glucuronic acid);
- ghatti gum (polymer derived from arabinose, galactose, mannose, xylose and glucuronic acid);
- karaya gum (polymer derived from galacturonic acid, galactose, rhamnose and glucuronic acid);
- gum tragacanth (polymer of galacturonic acid, galactose, fucose, xylose and arabinose);

b) gums derived from algae, including:

- agar (polymer derived from galactose and anhydrogalactose);
- alginates (polymers of mannuronic acid and of glucuronic acid);
- carrageenans and furcellerans (polymers of galactose sulfate and of anhydrogalactose sulfate);

c) gums derived from seeds or tubers, including:

- guar gum (polymer of mannose and galactose);
- locust bean gum (polymer of mannose and galactose);
- fenugreek gum (polymer of mannose and galactose);
- tamarind gum (polymer of galactose, xylose and glucose);
- konjac gum (polymer of glucose and mannose);

d) microbial gums, including:

- xanthan gum (polymer of glucose, mannose acetate, mannose/pyruvic acid and glucuronic acid);
- gellan gum (polymer of partially acylated glucose, rhamnose and glucuronic acid);
- scleroglucan gum (glucose polymer).

The polysaccharide(s) of the composition according to the invention can also be chosen from mixtures of the polysaccharides above.

These polymers can be physically or chemically modified. As physical treatment, mention may in particular be made of a heat treatment.

Chemical treatments that may be mentioned include esterification, etherification, amidation and oxidation reactions. These treatments make it possible to produce polymers that may especially be non-ionic, anionic or amphoteric.

Preferably, these chemical or physical treatments are applied to guar gums, and locust bean gums.

The non- ionic guar gums that may be used according to the invention may be modified with C1-C6 (poly)hydroxyalkyl groups.

Among the C1-C6 (poly)hydroxyalkyl groups, mention may be made, by way of example, of hydroxymethyl, hydroxyethyl, hydroxypropyl and hydroxybutyl groups.

These guar gums are well known in the prior art and may be prepared, for example, by reacting corresponding alkene oxides, for instance, propylene oxides, with the guar gum so as to obtain a guar gum modified with hydroxypropyl groups.

The degree of hydroxyalkylation preferably varies from 0.4 to 1.2 and corresponds to the number of alkylene oxide molecules consumed by the number of free hydroxyl functions present on the guar gum.

Such non-ionic guar gums optionally modified with hydroxyalkyl groups are sold, for example, under the trade names Jaguar HP8, Jaguar HP60 and Jaguar HP120 by the company Rhodia Chimie.

The cationic guar gum is preferably hydroxypropyl guar hydroxypropyltrimonium chloride, typically commercially available under the tradename of JAGUAR C 162, from the company Rhodia.

Particularly preferably, the polysaccharide thickener is chosen from:

- agar,
- guar, and
- combinations of these compounds,

these polysaccharide thickeners being optionally modified by a heat treatment, an esterification reaction, an etherification reaction, an amidation reaction or an oxidation reaction,

Even more preferably, the polysaccharide thickener is selected from agar, hydroxypropyl guar hydroxypropyltrimonium chloride, and a combination thereof.

The polysaccharide thickener can be mineral esters of cellulose (cellulose nitrates, sulfates, phosphates, etc.), organic cellulose esters (cellulose monoacetates, triacetates, amidopropionates, acetatebutyrates, acetatepropionates and acetatetrimellitates, etc.), and mixed organic/mineral esters of cellulose, such as cellulose acetatebutyrate sulfates and cellulose acetatepropionate sulfates. Among the cellulose ester ethers, mention may be made of hydroxypropylmethylcellulose phthalates and ethylcellulose sulfates.

The polysaccharide thickener can non- ionic cellulose ethers, mention may be made of (C1- C4)alkylcelluloses, such as methylcelluloses and ethylcelluloses (for

example, Ethocel standard 100 Premium from Dow Chemical); (poly)hydroxy(C1-C4)alkylcelluloses, such as hydroxymethylcelluloses, hydroxyethylcelluloses (for example, Natrosol 250 HHR provided by Ashland) and hydroxypropylcelluloses (for example, Klucel EF from Aqualon); mixed (poly)hydroxy(C1-C4)alkyl(C1-C4)alkylcelluloses, such as hydroxypropylmethylcelluloses (for example, Methocel E4M from Dow Chemical), hydroxyethylmethylcelluloses, hydroxyethylethylcelluloses (for example, Bermocoll E 481 FQ from Akzo Nobel) and hydroxybutylmethylcelluloses.

The polysaccharide thickener can be anionic cellulose ethers, mention may be made of (poly)carboxy(C1-C4)alkylcelluloses and salts thereof. By way of example, mention may be made of carboxymethylcelluloses, carboxymethylmethylcelluloses (for example Blanose 7M from the company Aqualon) and carboxymethylhydroxyethylcelluloses, and the sodium salts thereof.

The polysaccharide thickener can be cationic cellulose ethers, mention may be made of cationic cellulose derivatives such as cellulose copolymers or cellulose derivatives grafted with a water-soluble quaternary ammonium monomer, and described in particular in patent US 4 131 576, such as (poly)hydroxy(C1-C4)alkyl celluloses, for instance hydroxymethyl-, hydroxyethyl- or hydroxypropylcelluloses grafted especially with a methacryloylethyltrimethylammonium, methacrylamidopropyltrimethylammonium or dimethyldiallylammonium salt. The commercial products corresponding to this definition are more particularly the products sold under the names Celquat® L 200 and Celquat® H 100 by the company National Starch.

In a most particularly preferred embodiment of the invention, the composition comprises at least two distinct polysaccharides such as those mentioned above.

In particular in this preferred embodiment, the composition according to the invention comprises a combination of agar, celluloses and guar such as those mentioned above, in particular a combination of agar and cationic hydroxyalkyl guar such as hydroxypropyl guar hydroxypropyltrimonium chloride and hydroxyalkyl cellulose such as hydroxypropyl methyl cellulose.

Advantageously, the polysaccharide thickener is present in the composition according to the present invention in an amount ranging from 0.05 wt.% to 2 wt.%, preferably from 0.1 wt.% to 1.5 wt.%, more preferably from 0.2 wt.% to 1.0 wt.%, relative to the total weight of the composition.

Advantageously, the outer shell of the capsules comprise from 0.1 wt.% to 2 wt.% of agar and from 0.05 wt.% to 2 wt.% of cationic hydroxyalkylguar, relative to the total weight of the composition according to the present invention.

More advantageously, the outer shell of the capsules comprises from 0.1 wt.% to 1 wt.% of agar and from 0.05 wt.% to 1 wt.% of hydroxypropyl guar hydroxypropyltrimonium chloride, relative to the total weight of the composition according to the present invention.

The shell may also comprise a pigment.

The pigment is not particularly limited.

For example, the pigment can be selected from titanium dioxide, zirconium oxide, cerium oxide, zinc oxide, iron oxide, alumina, aluminum hydroxide, chromium oxide, manganese violet, ultramarine blue, chromium hydrate, ferric blue, aluminum powder, copper powder, silver powder, gold powder, barium sulfate, carbon black, mica, and a mixture thereof.

In some embodiments, the outer shell in the composition according to the present invention comprises mica as pigment.

Liquid medium

According to the first aspect, the liquid medium in the composition according to the invention is a hydroalcoholic medium.

In particular, the liquid medium is a hydroalcoholic medium comprising water and monoalcohols and/or polyols, preferably polyol.

The term "polyol" should be understood as meaning, within the meaning of the present disclosure, an organic molecule comprising at least two free hydroxyl groups. The polyols of the cosmetic composition may be glycols or compounds with numerous hydroxyl groups. In some cases, the one or more polyols is/are selected from the group consisting of C2-C32 polyols. The one or more polyols are liquid at ambient temperature (25°C). The one or more polyols may have from 2 to 10 carbon atoms, preferably from 3 to 10 carbon atoms, more preferably from 3 to 8 carbon atoms.

Monoalcohols can be ethanol, propanol, butanol, etc.

Polyols that may be included in the compositions of the present disclosure, in certain instances, include from ethylene glycol, propylene glycol, butylene glycol, hexylene glycol, pentylene glycol, diethylene glycol, dipropylene glycol, 1,3-propanediol, polyethylene glycols, caprylyl glycol, diglycerin, glycerin, or mixtures

thereof. In some cases, the polyol is butylene glycol. In some further cases, the at least one polyol comprises butylene glycol. Additionally, in some cases, the compositions comprise at least butylene glycol, and one or more polyols other than butylene glycol such as propylene glycol, dipropylene glycol, and/or glycerin.

Non-limiting examples of polyols that may, optionally, be included in the cosmetic include and/or may be chosen from alkanediols such as glycerin, 1,2,6-hexanetriol, trimethylolpropane, ethylene glycol, propylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, pentaethylene glycol, dipropylene glycol, 2-butene-1,4-diol, 2-ethyl-1,3-hexanediol, 2-methyl-2,4-pentanediol, caprylyl glycol, 1,2-hexanediol, 1,2-pentanediol, and 4-methyl-1,2-pentanediol; glycol ethers such as ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, ethylene glycol monobutyl ether, ethylene glycol monomethyl ether acetate, diethylene glycol monomethyl ether, diethylene glycol monoethyl ether, diethylene glycol mono-n-propyl ether, ethylene glycol mono-iso-propyl ether, diethylene glycol mono-iso-propyl ether, ethylene glycol mono-n-butyl ether, ethylene glycol mono-t-butyl ether, diethylene glycol mono-t-butyl ether, 1-methyl-1-methoxybutanol, propylene glycol monomethyl ether, propylene glycol monoethyl ether, propylene glycol mono-t-butyl ether, propylene glycol mono-n-propyl ether, propylene glycol mono-iso-propyl ether, dipropylene glycol monomethyl ether, dipropylene glycol monoethyl ether, dipropylene glycol mono-n-propyl ether, dipropylene glycol mono-iso-propyl ether, sorbitol, sorbitan, triacetin, and a mixture thereof.

The one or more polyols may, optionally, be glycols or glycol ethers such as, e.g., monomethyl, monoethyl and monobutyl ethers of ethylene glycol, propylene glycol or ethers thereof such as, e.g., monomethyl ether of propylene glycol, butylene glycol, hexylene glycol, dipropylene glycol as well as alkyl ethers of diethylene glycol, e.g., monoethyl ether or monobutyl ether of diethylene glycol. In some cases, the one or more polyols may include or are chosen from ethylene glycol, propylene glycol, butylene glycol, hexylene glycol, pentylene glycol, 1,3-propanediol, diethylene glycol, dipropylene glycol, caprylyl glycol, glycerin, and a mixture thereof.

In one or more embodiments, the at least one polyol comprises one or more glycols.

Preferably, the glycols are selected from the group consisting of hexylene glycol, butylene glycol, propylene glycol, dipropylene glycol, and combinations thereof.

Even more preferably, the at least one polyol comprises butylene glycol, in particular, 1, 3-butylene glycol. Most preferably, the butylene glycol is produced by biotechnology.

Advantageously, the alcohol(s), especially the polyol(s), is present in the composition of the present invention in an amount ranging from 2 wt.% to 50 wt.%, more preferably from 4 wt.% to 40 wt.%, most preferably from 4 wt.% to 20 wt.%, relative to the total weight of the composition.

In some embodiments, the medium comprises 50-80 wt.% of water in the medium, relative to the total weight of the composition.

Adjuvants or additives

The liquid medium or the hydrogel outer shell of the present invention may comprise conventional cosmetic adjuvants or additives, for instance preserving agents and bactericides, hydrophilic thickener hair conditioners.

As examples of hydrophilic thickener, mention can be made of celluloses as above described.

As hair conditioner, mention can be made of cationic polymers, fatty alcohol, fatty ester, silicones, aminosilicones

If presents, the hydrophilic thickener in the liquid medium is present in an amount ranging from 0.05 wt.% to 5 wt.%, preferably from 0.1 wt.% to 3 wt.%, more preferably from 0.1 wt.% to 2 wt.%, relative to the total weight of the composition.

Preferably, the liquid medium comprises 0.05 wt % to 1 wt % of hydroxypropyl methyl cellulose, relative to the total weight of the composition.

According to a preferred embodiment, the present invention provides a composition for conditioning the hair comprising, hydrogel capsules suspended in a liquid medium, wherein the capsules comprises, relative to the total weight of the composition:

- a) an inner core comprising from 8 wt.% to 25 wt.% of soybean oil; and
- b) a hydrogel outer shell comprising from 0.1 wt.% to 1 wt.% of agar and from 0.05 wt.% to 1 wt.% of hydroxypropyl guar hydroxypropyltrimonium chloride, and water;

wherein the liquid medium comprises from 2 wt.% to 40 wt.% of polyol, especially butylene glycol, and from 0.1 wt.% to 2 wt.% of alkylcellulose, especially, hydroxypropyl methylcellulose and water.

Preparation and use

The composition according to the present invention can be prepared by firstly preparing capsules and then suspending the hydrogel capsules in the liquid medium.

The capsules can be prepared with a known process. For example, the composition according to the present invention can be prepared as follows:

- 1) a phase (A) for the outer shell is prepared separately to include all ingredients in the outer shell;
- 2) a phase (B) for the inner core is prepared separately to include all ingredients in the core;
- 3) a medium is prepared separately to include all ingredients in the medium;
- 4) capsules are formed in a cooling base by a dripping process with both phases (A) and (B);
- 5) the capsules formed are cleaned and mixed with the medium so that the capsules are suspended in the medium.

The process for producing hydrogel capsules are well known in the art. In particular, the hydrogel capsules can be prepared through phase separation with different surface tensions.

For example, a three-flow concentric dripper can be used to prepare hydrogel capsules, the center is for the core phase, the middle layer is for the hydrogel outer shell concentrically wrapped the core phase, the outermost layer is for a gas flow or cooling fluid.

The composition according to the present invention can be used individually or mixed with cationic hair-treatment system to improve hair conditioning benefits.

The use of the composition can be done on wet or dry hair.

According to the second aspect of the present invention, a process for conditioning the hair comprising applying the composition as described above onto the hair.

In some embodiments, the process comprises the step of mixing the composition according to the present invention with a hair composition comprising a cationic conditioner and then applying the mixture obtained onto the hair.

The conditioning composition comprising a cationic conditioner is not particularly limited. For example, it can be any commonly used in the art, such as

distearyldimethylammonium chloride, cetyltrimethylammonium chloride, behenyltrimethylammonium chloride, behentrimonium chloride, cetrimonium chloride, oleocetyltrimethylammonium chloride, stearamidopropyltrimethyl (myristyl acetate) ammonium chloride, di(C1-C2 alkyl)(C12-C22 alkyl)hydroxy(C1-C2alkyl)ammonium salt, such as dialkyldimethylammonium or alkyltrimethylammonium salt in which the alkyl radical preferably comprises 12 to 24 carbon atoms, propanetallowdiammonium dichloride, behentrimonium methosulfate, and mixtures thereof.

Furthermore, the composition according to the present invention can be combined with a mask preferably containing one or more cationic conditioner and then put on the hair.

The following examples are given by way of illustration of the present invention and shall not be interpreted as limiting the scope.

EXAMPLES

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

Table 1

INCI Name	Trade Name	Supplier
BUTYLENE GLYCOL	BUTYLENE GLYCOL-1.3	KH NEOCHEM
GLYCINE SOJA (SOYBEAN) OIL	REFINED CT SOYBEAN OIL	ZOR
AGAR	AGAR A	MORISHITA JINTAN
HYDROXYPROPYL GUAR HYDROXYPROPYLTRIMONIUM CHLORIDE	JAGUAR C 162 SGI	RHODIA (SOLVAY)
HYDROXYPROPYL METHYLCELLULOSE	METHOCEL K 15 M PREMIUM	DOW
BLACK MICA	COLORONA BLACKSTAR GREEN	MERCK

Invention Examples 1-3

Compositions according to invention examples (IE.) 1-3 were prepared with the ingredients listed in Table 2 (the contents are expressed in gram):

Table 2

phase	Components	IE.1	IE2	IE.3
Core	GLYCINE SOJA (SOYBEAN) OIL	16.67	17.49	19.93
Shell	AGAR	0.4	0.33	0.24
	HYDROXYPROPYL GUAR HYDROXYPROPYLTRIMONIUM CHLORIDE	0.16	0.13	0.09
	PIGMENTS	0.22	0.3	0.3
	WATER	35	65	65
Liquid Medium	HYDROXYPROPYL METHYLCELLULOSE	0.16	0.16	0.54
	BUTYLENE GLYCOL	32	5.21	5.86
	WATER	to 100	to 100	to 100
Average diameter size of the capsule*		3-5 mm	3-5 mm	3-5 mm

* The average diameter size can be measured with a Brookhaven type BI90PLUS® particle sizer based on quasielastic light scattering (QELS).

Preparation procedure:

The compositions above were prepared as follows, taking composition of invention example 1 as an example.

1) a phase (A) for the outer shell was prepared separately to include water, agar, hydroxypropyl guar hydroxypropyltrimonium chloride, and black mica;

2) a phase (B) for the inner core was prepared separately to include glycine soja (soybean) oil;

3) a liquid medium was prepared separately to include butylene glycol, hydroxypropyl methylcellulose, and water;

4) Capsules were formed in a cooling base by a dripping process with both phases (A) and (B);

In particular, with syringe pumps, the phase (B) was transported to the center of a three-flow concentric dripper, the phase (A) was transported to the middle layer of the concentric dripper, a concentric liquid column was formed by the phase (A), and compressed air was blown out from the outmost layer of the concentric dripper to force the liquid column and the phase (B) to be blown into small capsules and drip into a collection container;

5) The capsules formed, which are spherical, were cleaned and mixed with the liquid medium so that the capsules were suspended in the medium.

Evaluation

Stability evaluation and sensorial evaluation were performed on the compositions prepared above.

Stability

Stability of each composition can be assessed based on quick stability tests under extreme conditions, full stability, and shaking stability as follows.

Stability tests:

The following tests were conducted

1. Stability in extreme conditions

- The sample to be tested was placed in the oven at 50 °C for 2 weeks.
- The sample to be tested was placed in the fridge at -10 °C for 24 hours.

2. Full stability

- The samples to be tested were placed in an oven at 45°C, 4 °C and room temperature, respectively, for two months.

After each test, the organoleptic properties Aspect, Color and Odor of the sample were checked.

The sample is deemed stable if there is no separation between capsules and the medium and no change on organoleptic properties.

Shaking stability

The sample to be tested was filled in a plastic box, and placed in a shaking plaque during a period of 60 minutes.

After the test finished, the samples were open and checked if there is any breakage of the capsules. A white color means a breakage of the capsules due to emulsification between the oil in the inner core and the liquid medium, The test was repeated for 2 times.

The results for stability tests are summarized in Table 3.

Table 3

	IE.2
Stability at extreme conditions	Stable
Full stability	Stable
Shaking stability	No color change

In vivo expert sensorial evaluation

Half head comparison between each composition of invention examples 1-3 in combination with a hair mask (available as Kerastase Chronologiste Mask from the company L'Oréal) and a commercial product in the market sold under the name Kérastase Perles de caviar Chronologiste by the company Kérastase (which comprises agar beads suspended in water gel) in combination with the same hair mask was carried out by inviting 6 models (women aged 30-50 years old with middle to high damage hair level) to put the composition to be tested on the hair mask, to mix the beads in the mask and then apply the hair mask with the composition to be tested on the head, one half with the composition of invention example to be evaluated, and the other half with the commercial product, and asking hair experts (the salon hairdresser from Kérastase Salon and R&I) to provide feedback on the usage and cosmetic performance.

The sensorial evaluation results show that the compositions of the invention provide an improved conditioning effect over the commercial products.

The mixing of the beads with the mask is easier with the compositions of the invention, particularly with compositions IE.2 and IE.3.

The resulting inventive compositions after mixing are more uniform with no bead residue, thus rendering easier the application step onto the hair. The resulting inventive mixtures are also easier to rinse.

It can be seen that the compositions according to the present invention are stable and can provide the hair with conditioning benefits. Meanwhile, the compositions according to the present invention can be applied easily and uniformly on the hair, and be rinsed off easily.

Claims

1. A composition for conditioning the hair comprising hydrogel capsules suspended in a liquid medium, wherein the capsules comprises:

- a) an inner core comprising at least one oil; and
 - b) a hydrogel outer shell comprising water and at least one polysaccharide thickener,
- wherein the liquid medium is a hydroalcoholic medium.

2. Composition according to claim 1, wherein the oil is a triglyceride oil with the following formula (I)



wherein R_1 , R_2 and R_3 are independently chosen from C_6 - C_{30} alkyl and C_6 - C_{30} alkenyl, preferably, R_1 , R_2 and R_3 are independently chosen from C_6 - C_{20} alkyl and C_6 - C_{20} alkenyl, more preferably, R_1 , R_2 and R_3 are independently chosen from C_6 - C_{12} alkyl and C_6 - C_{12} alkenyl, said alkyl or alkenyl is linear or branched,

preferably the triglyceride is selected from peanut oil, sesame oil, avocado oil, coconut oil, cocoa butter oil, almond oil, safflower oil, corn oil, cotton seed oil, olive oil, jojoba oil, palm oil, soybean oil, wheat germ oil, linseed oil, sunflower seed oil, and a combination thereof.

3. Composition according to claim 1 or 2, wherein the oil is present in an amount ranging from 3 wt.% to 40 wt.%, more preferably from 5 wt.% to 35 wt.%, most preferably from 8 wt.% to 25 wt.%, relative to the total weight of the composition.

4. Composition according to any of claims 1-3, wherein the sugar units included in the polysaccharide thickener are derived from one or more of the following sugars: glucose, galactose, arabinose, rhamnose, mannose, xylose, fucose, anhydrogalactose, galacturonic acid, glucuronic acid, mannuronic acid, galactose sulfate, anhydrogalactose sulfate and fructose.

5. Composition according to any of claims 1-4, wherein the polysaccharide thickener is selected from agar, guar, and combinations of these compounds, these polysaccharide gum being optionally modified by a heat treatment, an esterification reaction, an etherification reaction, an amidation reaction or an oxidation reaction,

preferably, the polysaccharide thickener is selected from agar, hydroxypropyl guar, hydroxypropyltrimonium chloride, and a combination thereof.

6. Composition according to any of claims 1-5, wherein the polysaccharide thickener is selected from

a) tree or shrub exudates, including: gum arabic; ghatti gum; karaya gum; gum tragacanth;

b) gums derived from algae, including: agar; alginates; carrageenans and furcellerans;

c) gums derived from seeds or tubers, including: guar gum; locust bean gum; fenugreek gum; tamarind gum; konjac gum; and

d) microbial gums, including: xanthan gum; gellan gum; scleroglucan gum, and the polysaccharide thickener is optionally physically or chemically modified, preferably modified by a heat treatment, an esterification reaction, an etherification reaction, an amidation reaction or an oxidation reaction.

7. Composition according to any of claims 1-6, wherein the polysaccharide thickener is present in an amount ranging from 0.05 wt.% to 2 wt.%, preferably from 0.1 wt.% to 1.5 wt.%, more preferably from 0.2 wt.% to 1.0 wt.%, relative to the total weight of the composition.

8. Composition according to any of claims 1-7, wherein the hydroalcoholic medium comprises a polyol.

9. Composition according to claim 8 wherein the polyol has from 2 to 10 carbon atoms, from 3 to 10 carbon atoms, more preferably from 3 to 8 carbon atoms, even more preferably, the polyol is selected from hexylene glycol, butylene glycol, propylene glycol, dipropylene glycol, glycerin, and combinations thereof.

10. Composition according to any of claims 1-9, wherein the polyol is present in an amount ranging from 2 wt.% to 50 wt.%, more preferably from 4 wt.% to 40 wt.%, most preferably from 4 wt.% to 20 wt.%, relative to the total weight of the composition.

11. Composition according to any of claims 1-10, further comprising as a hydrophilic thickener in the liquid medium at least one alkylcellulose, preferably

selected from (C1- C4) alkylcelluloses; (poly)hydroxy(C1-C4)alkylcelluloses, such as hydroxymethylcelluloses, hydroxyethylcelluloses and hydroxypropylcelluloses; mixed (poly)hydroxy(C1-C4)alkyl(C1-C4)alkylcelluloses, such as hydroxypropylmethylcelluloses, hydroxyethylmethylcelluloses, hydroxyethylethylcelluloses and hydroxybutylmethylcelluloses, and a combination thereof.

12. Composition according to claim 11, wherein the hydrophilic thickener is present in an amount ranging from 0.05 wt.% to 5 wt.%, preferably from 0.1 wt.% to 3 wt.%, more preferably from 0.1 wt.% to 2 wt.%, relative to the total weight of the composition.

13. Composition according to claim 1, comprising hydrogel capsules suspended in a liquid medium, wherein the capsules comprises, relative to the total weight of the composition:

- a) an inner core comprising from 8 wt.% to 25 wt.% of soybean oil; and
 - b) an outer shell comprising from 0.1 wt.% to 1 wt.% of agar and from 0.05 wt.% to 1 wt.% of hydroxypropyl guar hydroxypropyltrimonium chloride, and water;
- wherein the liquid medium comprises from 2 wt.% to 40 wt.% of polyol and from 0.1 wt.% to 2 wt.% alkylcellulose.

14. Composition according to any of claims 1-13, wherein the hydrogel capsules have a particle size of 0.3-15 mm, preferably 1-10 mm, more preferably 2-6 mm, preferably, the outer shell has a thickness of 0.1-2 μm , preferably 0.1-1.5 μm .

15. Composition according to any of claims 1-14, wherein the weight ratio of the capsules to the medium is from 10:90 to 40:60, preferably from 20:80 to 40:60.

16. A process for conditioning the hair comprising applying the composition according to any of claims 1-15 onto the hair.

17. The process according to claim 16 comprising the step of mixing the composition according to any of claims 1-15 with a hair composition comprising a cationic conditioner and then applying the mixture obtained onto the hair.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/090208

A. CLASSIFICATION OF SUBJECT MATTER

A61K 8/11(2006.01)i; A61K 8/92(2006.01)i; A61K 8/73(2006.01)i; B01J 13/02(2006.01)i; A61Q 5/00(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)

A61K; B01J; 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)

DWPI, SIPOABS, CNABS, CNTXT, EPTXT, USTXT, WOTXT, CATXT, CNKI, STN_{ext} (CAPLUS), ISI WEB OF SCIENCE, PubMed, Baidu; L'OREAL, OREA, EDUARDO ALVAREZ CAPOTE Paul, KONG Lingchao, CHIA Wi Soon, GU Xing, ZHOU Xiaoyin, YUAN Shuhong, capsule, hydrogel, core, shell, oil, soybean, triglyceride, agar, hydroxypropyltrimonium chloride, cellulose, suspend, hair

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2865423 A2 (INTERNATIONAL FLAVORS & FRAGRANCES INC.) 29 April 2015 (2015-04-29) description, paragraphs [0004], [0041]-[0042], [0012], [0035]-[0037], [0055], [0069]	1-17
X	CN 104434548 A (CHONGQING XIAOWAN TRADE CO., LTD.) 25 March 2015 (2015-03-25) claims 1-8, description, paragraphs [0007]-[0013], [0022]	1-17
X	WO 2020254370 A1 (V. MANE FILS) 24 December 2020 (2020-12-24) claims 1-18	1-17
A	US 2019224086 A1 (INTERNATIONAL FLAVORS & FRAGRANCES INC.) 25 July 2019 (2019-07-25) the whole document	1-17
A	CN 114317140 A (GUANGZHOU LIBAI ENTERPRISE GROUP LIMITED COMPANY) 12 April 2022 (2022-04-12) claims 1-7	1-17



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance
 “E” earlier application or patent but published on or after the international filing date
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 “O” document referring to an oral disclosure, use, exhibition or other means
 “P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 “X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
 “Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
 “&” document member of the same patent family

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INTERNATIONAL SEARCH REPORT

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 110961057 A (JIANGSU LUOGESI BIO-TECH CO., LTD.) 07 April 2020 (2020-04-07) the whole document	1-17

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2022/090208

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				CN	104560398	A	29 April 2015
				ES	2790417	T3	27 October 2020
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				AR	119194	A1	01 December 2021
				US	2022295835	A1	22 September 2022
US	2019224086	A1	25 July 2019	None			
CN	114317140	A	12 April 2022	None			
CN	110961057	A	07 April 2020	None			