Title: COMPOSITION COMPRISING CYCLODEXTRIN AND ITS DERIVATIVE, ANIONIC SURFACTANT AND POLYALKYLENE GLYCOL ETHER OF ALCOHOL, AND ITS USE THEREOF

Abstract: A composition comprising cyclodextrin or its derivatives, anionic surfactants, and polyalkylene glycol ether of alcohols of alcohol of formula (II), CH₃(CH₂)ₐ(OR) bOH (II) is provided, wherein: a is an integer of 4 to 14; b is an integer of 2 to 30; and R is an alkylene group.
Technical Field

The present invention relates to the field of hair care. More specifically, the present invention relates to a composition for caring for keratin materials, especially the hair, and a method for using the same.

Background of the invention

It is known that products, in particular cosmetic products, having an iridescent, moire or metallized appearance are widely appreciated by consumers for their aesthetic nature and the rich appearance. The agents that give this effect are pearlescent or nacreous agents generally comprising crystals that remain dispersed in the compositions and that reflect light. Cyclodextrins have already been used for making nacreous compositions. However, nacreous compositions with cyclodextrins have poor stability over time. EP 1499280, US2009/0074698 and EP 1779840 disclosed specific compositions with cyclodextrins with improved stability and nacreous effect.

To stabilize the composition, US2009/0074698 disclosed a cosmetic composition comprising a specific cationic polymer and cyclodextrin.

It is also known that good foaming properties as well as good conditioning properties of a cosmetic composition, especially the shampoos, are of great interests of the consumers, especially to those having sensitized hair (i.e. damaged and/or embrittled) of varying degrees under the action of atmospheric agents or under the action of mechanical or chemical treatments, such as dyes, bleaches and/or permanent-waving. So there still exists a need for a novel composition, having a nacreous appearance, with an improved stability, and providing a good foaming and
conditioning effect (i.e., disentangling of the hair, especially the dry hair) to the hair after application.

**Summary of the invention**

The object of the invention is to provide a composition comprising at least one cyclodextrin or its derivative, at least one anionic surfactant, and at least one polyalkylene glycol ether of alcohol.

More specifically, one object of the current invention is to provide a composition comprising, in an aqueous phase:

a) at least one cyclodextrin or its derivative;  
b) at least one anionic surfactant; and  
c) at least one polyalkylene glycol ether of alcohol of formula (II),

\[
\text{CH}_3(\text{CH}_2)a(\text{OR})_b\text{OH (II)}
\]

wherein:

a is an integer of 4 to 14;  
b is an integer of 2 to 30; and  
R is an alkylene group.

Another object of the present invention is to provide a method for caring for keratin materials, especially the hair, using the above described composition. The term "keratin material" means the skin (of the body, face and around the eyes), hair, eyelashes, eyebrows, bodily hair, nails, lips or mucous membranes. Preferably, it means the keratin fibers, especially the hair.

The composition as such is found to possess an improved stability, foaming, as well as conditioning effect.

According to the present invention, by "conditioning effect" it especially refers to the disentangling of dried hair after application of the composition as described above.
Detailed Description of the Present Invention

According to the present invention, the composition comprises, in an aqueous phase:

a) at least one cyclodextrin or its derivative;

b) at least one anionic surfactant; and

d) at least one polyalkylene glycol ether of alcohol of formula (II),

$$\text{CH}_3(\text{CH}_2)_a(\text{OR})_b\text{OH (II)}$$

wherein:

a is an integer of 4 to 14;

b is an integer of 2 to 30; and

R is an alkylene group.

Aqueous phase

The composition of the present invention comprises an aqueous phase. The aqueous phase comprises water and may comprise water-miscible organic solvents (at room temperature of 20-25°C), for instance monoalcohols containing from 2 to 6 carbon atoms, such as ethanol or isopropanol; polyols especially containing from 2 to 20 carbon atoms, preferably containing from 2 to 10 carbon atoms and preferentially containing from 2 to 6 carbon atoms, such as glycerol, propylene glycol, butylene glycol, pentylene glycol, hexylene glycol, dipropylene glycol or diethylene glycol; glycol ethers (especially containing from 3 to 16 carbon atoms) such as mono-, di- or tripropylene glycol (Ci-C_4)alkyl ethers, mono-, di- or triethylene glycol (Ci-C_4)alkyl ethers, and mixtures thereof.

In particular, the composition of the present invention comprises from 45% to 85% by weight, especially from 50% to 75% and more particularly from 55% to 65% by weight of the aqueous phase, relative to the total weight of the composition.
Cyclodextrin and its derivatives

The composition of the present invention comprises at least one cyclodextrin or its derivative.

Cyclodextrins are especially oligosaccharides of formula (I):

\[
\begin{array}{c}
\text{CH}_2\text{OH} \\
\text{OH} \\
\text{O} \\
\text{OH} \\
\text{CH}_2\text{OH} \\
\text{OH} \\
\text{OH} \\
\text{O} \\
\text{OH} \\
\text{CH}_2\text{OH} \\
\text{OH} \\
\text{OH} \\
\end{array}
\]

in which \( x \) is equal to 4 (which corresponds to \( \alpha \)-cyclodextrin), 5 (\( \beta \)-cyclodextrin) or 6 (\( \gamma \)-cyclodextrin).

A beta-cyclodextrin sold by the company Wacker under the name Cavamax\textsuperscript{®} W7, or by the company Shandong Xinda Fine Chemical under the name Beta-Cyclodextrin, a gamma-cyclodextrin sold by the company Wacker under the name Cavamax\textsuperscript{®} W8, or a mixture thereof, may especially be used.

For the purposes of the present invention, the term "cyclodextrins" also means substituted cyclodextrin derivatives, for instance methyl cyclodextrins, in particular the methyl-beta-cyclodextrin sold by the company Wacker under the name Cavasol\textsuperscript{®} W7.

Preferably, the cyclodextrins of the invention are unsubstituted.

Even more preferably, a beta-cyclodextrin will be used.

According to the invention, the cyclodextrin(s) may represent from 0.5% to 15% by weight, preferably from 1% to 10% by weight, preferentially from 1% to 5% by weight and better still from 1% to 2.5% by weight relative to the total weight of the final composition.

Anionic surfactant

The composition of the invention comprises at least one anionic surfactant or "surface-active agent".
Anionic surfactant is understood to mean an amphiphilic compound in which
the hydrophobic part carries an anionic hydrophilic group with a cationic
counterion which is generally metallic (alkali metal, such as Na or K) or
ammonium; the hydrophilic group is thus polar and capable of dissociating to
give anions in aqueous solution.

More particularly the anionic part of the anionic surfactant is belonging to the
group chosen from: C(O)OH, -C(O)O-, -SO_3H, -SO_3(O)-, -OS(O)_{2}OH,
-OS(O)_{2}O^-, -P(O)OH, -P(O)O_{2}O^-, -P(O)O_{2}O^-, =P(O)O, =P(O)OH, =P(O)OH^-,
=SO^-, =POH, =PO^-, the anionic part comprizing a cationic counter anion
such as alkali metal such as sodium, or alkaline earth metal such as
magnesium, or organic cationic counter anion such as ammonium salts, amine
salts, or aminoalcohol salts. The surfactants may also occur in their acid forms.
Mention may be made, as anionic surfactants or surface-active agents, of
surfactants or surface-active agents comprising carboxylate, sulfate, sulfonate,
sulfoacetate, sulfosuccinate, phosphate, isethionate, sarcosinate, glutamate,
lactylate or taurate anionic groups, salts of fatty acids, salts of galactosiduronic
acids, salts of ether carboxylic acids surfactants and their mixtures.

More particularly, the anionic surfactants or surface-active agents or agents
according to the invention are chosen from:

(C_6-C_3₀)alkyl sulfates, (C_6-C_3₀)alkyl ether sulfates, (C_6-C_3₀)alkylannido
ether sulfates, alkylaryl polyether sulfates or monoglyceride sulfates;
preferably for this type of anionic surfactants, (C_6-C_3₀)alkyl ether
sulfates, alkylaryl polyether sulfates, or a mixture is used. Mentions may
be made of sulfate of ether of lauryl alcohol and alkylene oxide,
containing from 1 to 50 alkylene oxide groups.

More preferably, the anionic surfactants is chosen from sulfate of ether
of lauryl alcohol and alkylene oxide containing from 1 to 4 alkylene
oxide groups, especially ethylene oxide groups. For example, sodium
laureth sulfate containing in average 2.2 ethylene oxide groups that are
sold by the company Cognis (BASF) under the name Texapon® AOS
225 UP, Rhodia under the name Rhodapex® esb-70/fla3, and Clariant under the name Genapol® LRO L'O, and sodium laureth sulfate containing in average 1 ethylene oxide group that is sold by the company Zhejiang Zanyu Technology under the name SLES (N1 EO).

- \((C_6-C_{30})\) alkyl sulfonates, \((C_6-C_{30})\) alkylamidesulfonates, \((C_6-C_{30})\) alkylaryl sulfonates, \(\alpha\)-olefin sulfonates, paraffin sulfonates;
- \((C_6-C_{30})\) alkyl phosphates;
- \((C_6-C_{30})\) alkyl sulfosuccinates, \((C_6-C_{30})\) alkyl ether sulfosuccinates or \((C_6-C_{30})\) alkylamido sulfosuccinates;
- \((C_6-C_{30})\) alkyl sulfoacetates;
- \((C_6-C_{24})\) acylsarcosinates;
- \((C_6-C_{24})\) acylglutamates;
- \((C_6-C_{30})\) alkylpolyglycoside carboxylic ethers;
- \((C_6-C_{30})\) alkylpolyglycoside sulfosuccinates;
- \((C_6-C_{30})\) alkyl sulfosuccinamates;
- \((C_6-C_{24})\) acyl isethionates, for example sodium lauroyl methyl isethionate, sodium cocoyl isethionate; mentiones may be made of the sodium lauroyl methyl isethionate which is sold under the trade name ISELUX® LQ-CLR-SB by the company Innospec Active Chemicals;
- N-\([(C_6-C_{24})\text{acyl}]\) taurates;
- salts of fatty acids;
- \((C_8-C_{20})\) acyl lactylates;
- salts of \((C_6-C_{30})\) alkyl-D-galactosiduronic acids;
- salts of \((C_6-C_{30})\) alkyl polyoxyalkylated ether carboxylic acids, of \((C_6-C_{30})\) alkylaryl polyoxyalkylated ether carboxylic acids or of \((C_6-C_{30})\) alkylamido polyoxyalkylated ether carboxylic acids;
- and their mixtures.

The alkyl or acyl radicals of these various anionic surfactants preferably comprise from 12 to 20 carbon atoms.

Furthermore, the oxyalkylated or polyoxyalkylated anionic surfactants or
surface-active agents preferably comprise from 1 to 50 alkylene oxide groups, more preferably from 1 to 4 alkylene oxide groups, in particular ethylene oxide groups.

Advantageously, according to an embodiment, the present invention comprises at least one anionic surfactant chosen from \((\text{C}_6-\text{C}_30)\)alkyl sulfates, \((\text{C}_6-\text{C}_30)\)alkyl ether sulfates, \((\text{C}_6-\text{C}_30)\)alkylamido ether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, \((\text{C}_6-\text{C}_2-\text{C}_4)\)acyl isethionates, or a mixture thereof.

According to an embodiment of the present invention, the anionic surfactant is preferably chosen from sodium laureth sulfate, sodium lauroyl methyl isethionate, sodium cocoyl isethionate, or a mixture thereof.

More preferably the anionic surfactant is sodium laureth sulfate containing in average 2.2 ethylene oxide groups.

Advantageously, the content of anionic surfactant(s) represents from 1% to 50% by weight, with respect to the weight of the composition, preferably from 5% to 30% by weight, with respect to the weight of the composition, or 10% to 25% by weight, with respect to the weight of the composition,

**polyalkylene glycol ether of alcohol**

The composition of the present invention comprises at least one polyalkylene glycol ether of alcohol, which can be defined as the formula (II),

\[ \text{CH}_3(\text{CH}_2)_a(\text{OR})_b\text{O} \text{H (II)} \]

wherein:

- \(a\) is an integer of 4 to 14;
- \(b\) is an integer of 2 to 30; and
- \(R\) is a alkylene group.

More preferably, according to an embodiment of the present invention, \(a\) is an integer of 6 to 12, more preferably \(a\) is 11;

\(b\) is an integer of 4 to 12;
R is ethylene, or propylene group, preferably ethylene group. Mentions may be made of polyethylene glycol ether of lauryl alcohol, and its mixture thereof.

More particularly, mentions may be made of laureth-4, or laureth-12, for example the products sold by the company Evonik Goldschmidt under the name Rewopal® 12, Ecogreen Oleochemicals under the name Ifralan L12, or Clariant under the name Genapol® LA 120 L'O.

Preferably, the at least one polyalkylene glycol ether of alcohol is present in the present invention in an amount ranging from 0.01 % to 10% by weight, preferably from 0.1 % to 5% by weight, more preferably from 0.2% to 2.5% by weight, relative to the total weight of the composition.

Additional ingredients

The composition of the present invention further comprises one or more the following additional ingredients.

Amphoteric surfactant or zwitterionic surfactant

According to an embodiment of the invention, the composition further comprises at least one amphoteric surfactant or zwitterionic surfactant.

The amphoteric or zwitterionic surfactant(s) that may be used in the present invention may be quaternized secondary or tertiary aliphatic amine derivatives containing at least one anionic group, for instance a carboxylate, sulfonate, sulfate, phosphate or phosphonate group, and in which the aliphatic group with a linear or branched chain comprising from 8 to 22 carbon atoms.

Mention may be made in particular of (C8-C20)alkylbetaines, sulfobetaines, (C8-C20 alkyl)amido(C2-C8 alkyl)betaines and (C8-C20 alkyl)amido(C2-C8 alkyl)sulfobetaines. For example the amphoteric or zwitterionic surfactant is chosen from cocoamidopropylbetaine, coco betaine, N-cocoamidocarboxymethyl glycinate of an alkali metal, or a mixture thereof. Among the amphoteric or zwitterionic surfactants, mention may be made of the compounds of respective structure (III) below:


in which \( R \) represents alkyl groups derived from coconut oil.

Preferably mention is made of cocoylbetaine, example the cocoylbetaine that is sold under the name Mirataine® BB/FLA by the company Rhodia.

Advantageously, if present, the amphoteric surfactant is present in an amount ranging from 1% to 15%, preferably from 3% to 12%, more preferably from 5% to 10%, by weight of the surfactant, relative to the total weight of the composition.

Cationic polymer

According to one embodiment, the composition of the present invention can contain a cationic polymer.

For the purposes of the present invention, the term "cationic polymer" denotes any polymer containing cationic groups and/or groups that can be ionized into cationic groups.

These polymers preferably have a number-average molecular mass generally of between 1000 and 100 000.


More particularly, the cationic polymer(s) are chosen from cationic cyclopolymer alkylallylamine or dialkyldiallylammonium, which may be a homopolymer or copolymer containing, as main constituent of the chain, units corresponding to formula (IV) or (V):
in which formulae d and e are equal to 0 or 1, the sum d + e being equal to 1;

R32 denotes a hydrogen atom or a methyl radical; R30 and R31, independently of each other, denote a CrC₈ alkyl group, a hydroxyalkyl group in which the alkyl group is C₁-C₅, an amidoalkyl group in which the alkyl is C₁-C₄; R30 and R31 can also denote, together with the nitrogen atom to which they are attached, a heterocyclic group such as piperidyl or morpholiny; R₃₀ and R₃₁, independently of each other, preferably denote a C₁-C₄ alkyl group; Y⁻ is an organic or mineral anion such as bromide, chloride, acetate, borate, citrate, tartrate, bisulfate, bisulfite, sulfate or phosphate. These polymers are described in particular in FR 2 080 759 and FR 2 190 406.

Among the polymers defined above, mention may be made more particularly of the dimethyldiallylammonium chloride homopolymer sold under the name "Merquat 100" by the company Nalco (and its homologues of low weight-average molecular mass) and the copolymers of diallyldimethylammonium chloride and of acrylamide, sold under the name Merquat 550.

Advantageously, the cationic cycopolymer used in the present invention is in presence in the composition from 0.1 % to 5 % by weight, preferably from 0.5 % to 2.5 %, more preferably from 0.5 % to 1 % by weight relative to the total weight
of the composition.

Adjuvant
The compositions according to the invention may naturally contain, in addition, all the standard adjuvants encountered in the field of the caring for keratin materials, especially the hair, such as, for example, silicones, perfumes, preservatives, sequestering agents, thickeners, hydrating agents, antidandruff or antiseborrhoeic agents, vitamins, sunscreen agents, suspending agents, stabilizers, for example sodium chloride, magnesium dichloride or magnesium sulfate, gelling agents, film-forming polymers, or surfactants, pH regulators, and the like.
In particular, the composition may comprise one or more silicones, volatile or non-volatile, or a mixture of volatile and non-volatile silicones. Mentions may be made of, for example, non-volatile silicones selected from the linear polydialkylsiloxane family containing terminal hydroxydimethylsilyl groups, such as the oils of the 48 V series from RHONE-POULENC, product Xiameter® PMX-200 silicone fluid 60000CS sold by Dow Corning.

Galenic form
The composition according to the invention may take the form of liquid, creams or gel. They may also take the form of lotions to be rinsed.
Another aspect of the invention is a method for caring for keratin materials, especially the hair, using the composition as above described.
The method of the present invention preferably comprises a step of foaming and a step of rinsing off.
More specifically, the method of the present invention is for washing the hair. Non limiting examples illustrating the invention are given.

Examples
Preparation of invention and comparative compositions

The following compositions were prepared (inv compo stands for invention composition, and compa compo stands for comparative compositions):

<table>
<thead>
<tr>
<th>INCI name</th>
<th>% by weight of active ingredient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inv compo 1</td>
</tr>
<tr>
<td>SODIUM LAURETH SULFATE 70% containing 2.2 mol of ethylene oxide (Texapon® AOS 225 UP from BASF)</td>
<td>15</td>
</tr>
<tr>
<td>COCOYLBETAINE (Cocoylbetaine, Mirataine® BB/FLA from Rhodia)</td>
<td>3</td>
</tr>
<tr>
<td>POLYQUATERNIUM-6 (Polydially dimethyl ammonium chloride, Merquat™ 100 polymer from Nalco (Lubrizol))</td>
<td>0.3</td>
</tr>
<tr>
<td>DIMETHICONE (Polydimethylsiloxanes, Xiameter® PMX-200 silicone fluid 60000CS from Dow Corning)</td>
<td>3</td>
</tr>
<tr>
<td>CARBOMER ( Carbomer, CARBOPOL® 980 POLYMER from LUBRIZOL)</td>
<td>0.2</td>
</tr>
<tr>
<td>Ingredient</td>
<td>Composition 1</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>CYCLODEXTRIN (CAVAMAX® W7 PHARMAfrom WACKER)</td>
<td>2</td>
</tr>
<tr>
<td>POLYSORBATE 21 (TWEEN™ 21-LQ-(MV) from Croda)</td>
<td>0</td>
</tr>
<tr>
<td>LAURETH-12 (Rewopal® 12 from Evonik Goldschmidt)</td>
<td>0.48</td>
</tr>
<tr>
<td>CITRIC ACID qs pH</td>
<td>5.2</td>
</tr>
<tr>
<td>SODIUM CHLORIDE</td>
<td>0.3</td>
</tr>
<tr>
<td>WATER</td>
<td>qs 100</td>
</tr>
</tbody>
</table>

Protocol of preparation:

100 g of each of the comparative compositions 1 and 2, as well as the invention composition 1 were prepared following the steps of:

5 a) mixing 2.8g sodium laureth sulfate, 0.6 g laureth-12 (if present) with water, melting at a temperature of 80°C, till the mixture is well dissolved; and then mixing with 2 g cyclodextrin till it is well dissolved, and then cooling down the mixture to room temperature, mixing with 0.3 g of sodium chloride (if present),

b) mixing 18.6 g of sodium laureth sulfate, 10 g of cocobetaine, 0.75 g of polyquaternium-6 with water under room temperature (25°C), then mixing with 0.2 g of carbomer and 3 g of dimethicone; and then mixing with mixture obtained from step a).

Evaluation of invention and comparative compositions

15 Evaluations on the stability, foaming effect, as well as dry combing effect of
the invention composition 1 and comparative compositions 1 and 2 were performed.

Stability

The stabilities of the invention composition 1 and comparative compositions 1 and 2 were evaluated by leaving the above mentioned compositions under 45°C for 2 months.

Result

It was observed that the comparative composition 1 was not stable over time, i.e. it has the issue of phase separation and thus non-homogeneous. While comparing to the comparative composition 1, invention composition 1 and comparative composition 2 were stable over time.

Foaming effect

The foaming effects of the compositions were evaluated based on the foaming abundance and the speed of foaming of the compositions.

For the purpose of the present invention, speed of foaming refers to the volume of foaming generated in 120 seconds.

The foaming abundance of the invention composition 1 and the comparative compositions 1 and 2 were evaluated following the steps of:

- weighing 4 g of the invention composition 1 and comparative compositions 1 and 2, respectively, into the kitchen blender produced by Philips with the model reference HR2004;
- diluting the invention composition 1 and comparative compositions 1 and 2, respectively, with water by 20 times of the volume of the composition;
- mixing the diluted compositions for 1 minute at speed 1;
- immediately transferring the produced foam and liquid into a graduate cylinder;
- measuring the total volume.

The speed of foaming of the compositions was evaluated according to the
steps of:
weighting 20 g of the invention example 1 and comparative examples 1 and 2, respectively, and placing them into kitchen blender produced by Philips with the model reference HR2004, respectively;
diluting the invention composition 1 and comparative compositions 1 and 2, respectively, with water by 1.25 times of the volume of the composition;
evaluating the speed of foaming of the diluted composition using the device Teclis FOAMSCAN under airflow of 15 ml/min, for 200 seconds.

Result

The results of the foaming effects of the compositions were shown as below:
Comparing to the comparative compositions 1 and 2, the invention composition shows a comparable speed of foaming effect, and an improved foaming abundance.

Dry combing effect

0.4 g of the invention composition 1 and comparative compositions 1 and 2 were applied on 6 g of natural black Chinese hair, and damaged Chinese hair, respectively. The compositions were then left on the hair for 5 minutes. Then the hair was rinsed by warm water for 10 seconds, and left to dry over night at room temperature. After 5 times repeated application using the process described herein, the combing force between the hair stress and a comb was measured by the device named Combing Tester JC45A-001, sold by JAU CHUNG. The reduction of combing force was measured based on the following formula (control is 9% of sodium laureth sulfate water solution):

<table>
<thead>
<tr>
<th></th>
<th>Inv compo 1</th>
<th>Compa compo1</th>
<th>Compa compo 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foaming abundance (ml)</td>
<td>410</td>
<td>370</td>
<td>380</td>
</tr>
<tr>
<td>Speed of foaming (ml)</td>
<td>82</td>
<td>81</td>
<td>80</td>
</tr>
</tbody>
</table>
Reduction (%) = \frac{F_{control} - F_{composition}}{F_{control}} \times 100%\

wherein:

Reduction (%) is the reduction of combing force;

F_{control} is the combing force of control composition;

F_{composition} is the combing force of the invention and comparative compositions, respectively.

Result

The results of the conditioning effects, especially the reduction of combing force of dry hair of the compositions were shown below:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Inv compo 1</th>
<th>Compa compo 1</th>
<th>Compa compo 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of Combing force on the dry hair (%)</td>
<td>88%</td>
<td>84%</td>
<td>80%</td>
</tr>
</tbody>
</table>

As shown in the table, the conditioning effect, especially the combing effect of dry hair of the invention composition 1 was much better comparing to the comparative composition 1 or 2. The invention as such possesses an improved conditioning effect, especially on the dry hair.
What is claimed is

1. A composition comprising, in an aqueous phase:
   a) at least one cyclodextrin or its derivative;
   b) at least one anionic surfactant; and
   c) at least one polyalkylene glycol ether of alcohol of formula (II),

   \[ \text{CH}_3(\text{CH}_2)_a(\text{OR})_b\text{OH (II)} \]

   wherein:
   a is an integer of 4 to 14;
   b is an integer of 2 to 30; and
   R is a alkylene group.

2. Composition of claim 1, wherein the aqueous is present in an amount ranging from 45% to 85% by weight, especially from 50% to 75% and more particularly from 55% to 65% by weight, relative to the total weight of the composition.

3. Composition of claim 1 or 2, wherein the cyclodextrin or its derivative is chosen from a-cyclodextrin, β-cyclodextrin, γ-cyclodextrin, methyl derivatives thereof, or a mixture thereof, preferably the cyclodextrin is chosen from β-cyclodextrin.

4. Composition of any one of the preceding claims 1 to 3, wherein the cyclodextrin is present in an amount ranging from 0.5% to 15% by weight, preferably from 1% to 10% by weight, more preferably from 1% to 5% by weight, and even more preferably from 1% to 2.5% by weight, relative to the total weight of the composition.

5. Composition of any one of the preceding claims 1 to 4, wherein the at least one anionic surfactant is chosen from the group consisting of carboxylate, sulfate, sulfonate, sulfoacetate, sulfosuccinate, phosphate, isethionate, sarcosinate, glutamate, lactylate or taurate anionic groups,
their salts, salts of fatty acids, salts of galactosiduronic acids, salts of ether carboxylic acids, or a mixture thereof.

6. Composition of any one of the preceding claims 1 to 5, wherein the at least one anionic surfactant is chosen from (C₆₋C₃₀)alkyl sulfates, (C₆₋C₃₀)alkyl ether sulfates, (C₆₋C₃₀)alkylamido ether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, (C₆₋C₃₀)alkyl sulfonates, (C₆₋C₃₀)alkylamidesulfonates, (C₆₋C₃₀)alkylaryl sulfonates, a-olefin sulfonates, paraffin sulfonates, (C₆₋C₃₀)alkyl phosphates, (C₆₋C₃₀)alkyl sulfosuccinates, (C₆₋C₃₀)alkyl ether sulfosuccinates, (C₆₋C₃₀)alkylamido sulfosuccinates, (C₆₋C₃ₒ)alkyl sulfoacetates, (C₆₋C₃ₒ)acylsarcosinates, (C₆₋C₂₄)acylglutamates, (C₆₋C₃ₒ)alkylpolyglycoside carboxylic ethers, (C₆₋C₃ₒ)alkylpolyglycoside sulfosuccinates, (C₆₋C₃ₒ)alkyl sulfosuccinamates, (C₆₋C₂₄)acyl isethionates, N-[(C₆₋C₂₄)acyl] taurates, salts of fatty acids, (C₈₋C₂₄)acyl lactylates, salts of (C₆₋C₃ₒ)alkyl-D-galactosiduronic acids, salts of (C₆₋C₃ₒ)alkyl polyoxyalkylated ether carboxylic acids, salts of (C₆₋C₃ₒ)alkylaryl polyoxyalkylated ether carboxylic acids, salts of (C₆₋C₃ₒ)alkylamido polyoxyalkylated ether carboxylic acids, or a mixture thereof.

7. Composition of any one of the claims 1 to 6, wherein the anionic surfactant is chosen from (C₆₋C₃ₒ) alkyl sulfates, (C₆₋C₃ₒ)alkyl ether sulfates, (C₆₋C₃ₒ)alkylamido ether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, (C₆₋C₂₄)acyl isethionates, or a mixture thereof; preferably from sodium laureth sulfate, sodium lauroyl methyl isethionate, sodium cocooyi isethionate, or a mixture thereof, more preferably the anionic surfactant is sodium laureth sulfate containing in average from 1 to 4 ethylene oxide groups, more preferably containing in average 2.2 ethylene oxide groups.
8. Composition of any one of the preceding claims 1 to 7, wherein the anionic surfactant is present in an amount ranging from 1% to 50% by weight, preferably from 5% to 30% by weight, more preferably from 10% to 25% by weight, relative to the total weight of the composition.

9. Composition of any one of the preceding claims 1 to 8, wherein the at least one polyalkylene glycol ether of fatty alcohol of formula (II),

\[ \text{CH}_3(\text{CH}_2)_a(\text{OR})_b\text{OH} \] (II)

wherein, preferably,

a is an integer of 6 to 12, more preferably a is 11;

b is an integer of 4 to 12;

R is ethylene, or propylene group, preferably ethylene group.

10. Composition of any one of the preceding claims 1 to 9, wherein the at least one polyalkylene glycol ether of fatty alcohol is chosen from polyethylene glycol ether of lauryl alcohol or its mixture; more preferably laureth-12, laureth-4, or a mixture thereof, more preferably laureth-12.

11. Composition of any one of the preceding claims 1 to 10, wherein the polyalkylene glycol ether of fatty alcohol is present in an amount ranging from 0.01 % to 10% by weight, from 0.1 % to 5% by weight, more preferably from 0.2% to 2.5% by weight, relative to the total weight of the composition.

12. Composition of any one of the preceding claims 1 to 11 further comprises at least one amphoteric surfactant or zwitterionic surfactant chosen from \((\text{C}_8-\text{C}_{20})\)alkylbetaines, sulfobetaines, \((\text{C}_8-\text{C}_{20})\)alkylamido\((\text{C}_2-\text{C}_8\text{ alkyl})\)betaines, \((\text{C}_8-\text{C}_{20})\)alkylamido\((\text{C}_2-\text{C}_8\text{ alkyl})\)sulfobetaines, or a mixture thereof, preferably chosen from cocoylemidopropylbetaine, cocoyletaine, N-cocoylemidocarboxymethyl
glycinate of an alkali metal, more preferably the amphoteric surfactant or zwitterionic surfactant is cocoylbetaine.

13. Composition of any one of the preceding claims 1 to 12, wherein the amphoteric surfactant or zwitterionic surfactant is present in an amount ranging from 1% to 15%, preferably from 3% to 12%, more preferably from 5% to 10% by weight, relative to the total weight of the composition.

14. Composition of any one of the preceding claims 1 to 13 comprises at least one cationic polymer chosen from:
cationic cyclopolymer alkyldiallylamine or dialkyldiallylammonium,
homopolymer or copolymer containing, as a main constituent of the chain, units of formula (IV) or (V):

![Chemical Structure](attachment:chemical_structure.png)

wherein,
d and e, same or different, are equal to 0 or 1, and the sum d + e being equal to 1,
R32 denotes a hydrogen atom or a methyl radical,
R30 and R31, independently of each other, denote a C1-Cs alkyl group, a hydroxyalkyl group in which the alkyl group is C1-C5, an amidoalkyl group in which the alkyl is C1-C4; R30 and R31 can also denote, together with the
nitrogen atom to which they are attached, a heterocyclic group such as piperidyl or morpholinyl; \( R_3 \) and \( R_{31} \), independently of each other, preferably denote a \( \text{C}_1-\text{C}_4 \) alkyl group.

\( Y \) is an organic or mineral anion such as bromide, chloride, acetate, borate, citrate, tartrate, bisulfate, bisulfite, sulfate or phosphate;

preferably the cationic polymer is chosen from dialkyldiallylammonium, more preferably dimethyldiallylammonium chloride homopolymer.

15. Composition of any one of the preceding claims 1 to 14 comprises at least one adjuvant chosen from silicones, perfumes, preservatives, sequestering agents, thickeners, hydrating agents, antidandruff or antiseborrhoeic agents, vitamins, sunscreen agents, suspending agents, stabilizers, for example sodium chloride, magnesium dichloride or magnesium sulfate, gelling agents, film-forming polymers, or surfactants, pH regulators, or a mixture thereof, wherein the silicone is preferably chosen from non-volatile silicones selected from the linear polydialkylsiloxane family containing terminal hydroxydimethylsilyl groups, more preferably polydimethylsiloxanes.

16. A method for caring for keratin materials, especially the hair, comprising the step of applying to the said keratin material the composition of any one of the preceding claims 1 to 15, preferably the method comprises steps of foaming and rinsing off, more preferably the method comprising washing the keratin materials, preferably the hair.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
A61K 8/86(2006.01); A61Q 5/02(2006.01); A61Q 19/10(2006.01)

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/; A61Q5/; A61Q197-

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)
WPI, EPDOC, CNKI, CNPAT, ISI Web of Knowledge: cyclodextrin, anionic surfactant, laureth, lauryl alcohol, polyethylene glycol ether, polyalkylene glycol ether

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.

Date of the actual completion of the international search: 08 August 2014
Date of mailing of the international search report: 26 September 2014

Name and mailing address of the ISA/

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Form PCT/ISA/210 (second sheet) (July 2009)
**INTERNATIONAL SEARCH REPORT**

**Information on patent family members**

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