Title: COSMETIC COMPOSITION COMPRISING AN ANIONIC OR NON-IONIC ASSOCIATIVE POLYMER, A FIXING POLYMER AND A PARTICULAR SURFACTANT

Abstract: The present invention relates to a cosmetic composition, in particular a cosmetic hair composition, comprising at least one anionic or non-ionic associative polymer, at least one anionic or non-ionic fixing polymer and at least one anionic, cationic or amphoteric surfactant.
The present invention relates to a cosmetic composition for treating keratin fibres, in particular human keratin fibres such as the hair, comprising at least one anionic or non-ionic associative polymer, at least one anionic or non-ionic fixing polymer and at least one particular surfactant, to a use of this composition for treating hair, and also to a cosmetic treatment process using it.

In the field of hairstyling, in particular among the hair products intended for shaping and/or for holding the hairstyle, the hair compositions generally consist of a solution, usually an alcoholic or aqueous solution, and of one or more fixing polymers as a mixture with various cosmetic adjuvants.

These compositions may be in the form of hair gels, lotions, mousses or sprays that are generally applied to wet hair before blow drying or drying.

In particular, hair gels consist in particular of one or more thickening polymers or gelling agents in combination with one or more fixing polymers, which usually have the role of of forming a film on the surface of the keratin fibres to be fixed in order to produce welds between them, thus structuring or constructing the hairstyle and giving it shape retention.

Document US 2007/0134191 describes, for example, several hairstyling gel compositions, one of the compositions comprising a fixing polymer, a non-ionic amphiphilic polymer and an emulsifier, in particular isoceteth-20 at 4%. Document WO 201/062805 also describes examples of a hairstyling gel composition comprising a fixing polymer combined with an anionic associative polymer, one of the compositions comprising 0.25% of laureth-30.

Hairstyling gels generally have medium to very strong hair fixing properties. In this fixing range, the shape retention of the hairstyle over time is often a function of the initial fixing level of the gel, but in any case remains very inadequate. Indeed, the locks of hair obtained by the application of a gel are subjected to mechanical stresses throughout the day, such as helmet wearing, running hands through the hair, wind, removal of clothing, etc.

Moreover, hairstyling gels are often difficult to remove from the hair, and especially from the hands at the time of application. Soap or shampoo are systematically needed in order to completely cleanse the hands and the hair.

There is thus a real need to find cosmetic compositions, especially for hairstyling, which allow long-lasting hold of the hairstyle and which are easily removed by washing.

Surprisingly and advantageously, the applicant has just discovered that, by combining a particular surfactant with an anionic or non-ionic associative polymer and an anionic or non-ionic fixing polymer, a hairstyling gel is obtained that has an improved hold of the hairstyle over time and that the gel is easily removed from the hands and the hair with water, without shampoo or soap.
A subject of the present invention is therefore in particular a cosmetic composition, in particular cosmetic hair composition, comprising at least one anionic or non-ionic associative polymer, at least one anionic or non-ionic fixing polymer and at least one anionic, cationic or amphoteric surfactant.

The combination according to the invention indeed makes it possible to obtain a hairstyling gel with very strong fixation, having an extreme hold over time and with respect to mechanical stresses, especially helmet wearing or hands being run through the hair, and enables the hands and the hair to be clean after rinsing with water.

According to one of its aspects, the present invention relates to a process for treating keratin fibres, in particular for shaping the hair, in which a cosmetic composition, in particular a cosmetic hair composition, comprising at least one anionic or non-ionic associative polymer, at least one anionic or non-ionic fixing polymer and at least one anionic, cationic or amphoteric surfactant, is applied to be keratin fibres.

The expression "at least one" is equivalent to the expression "one or more".

According to another aspect, the present invention relates to the use of a cosmetic composition as defined previously, for treating keratin fibres, in particular for retaining the form of and/or fixing the hair.

The expression "hair composition" is intended to mean a composition which is applied to the hair, that is to say in particular for retaining the form of and/or fixing the hairstyle, haircare, making up the hair or dyeing the hair.

The expression "hairstyling composition" is intended to mean a composition which makes it possible to give shape to the head of hair and/or to retain the acquired shape of the head of hair.

Within the meaning of the present invention, the expression "fixing polymer" is thus intended to mean a polymer capable of giving shape to the head of hair and/or of retaining the acquired shape of the head of hair.

The expression "associative polymers" is intended, for the purposes of the invention, to mean amphiphilic polymers comprising both a) one or more hydrophobic units each consisting of one or more fatty chains and b) one or more hydrophilic units. These polymers result from a polymerization involving at least one monomer other than an alkylene oxide or glycidol oxide. They may, for example, be obtained by means of radical polymerisation reactions, polycondensation reactions, or reactions for grafting onto prepolymers.

The expression "fatty chain" should be understood to mean, according to the invention, a linear or branched, optionally hydroxylated, alkyl or alkenyl chain having from 8 to 30 and preferably from 10 to 30 carbon atoms.

The associative polymers of the composition according to the invention are of anionic or non-ionic type. They may be crosslinked or non-crosslinked.

Among the associative polymers of anionic type that may be mentioned are:
- (I) those comprising at least one hydrophilic unit and at least one fatty-chain allyl ether unit, more particularly those of which the hydrophilic unit is formed by an ethylenic unsaturated anionic monomer, even more particularly by a vinylcarboxylic acid and most particularly by an acrylic acid or a methacrylic acid or mixtures thereof, the fatty-chain allyl ether unit of which corresponds to the monomer of formula (I) below:

\[ CH_2 = C R' CH_2 O B_n R \]  

in which \( R' \) denotes H or CH\(_3\), B denotes an ethylenoxy radical, \( n \) is zero or denotes an integer ranging from 1 to 100, \( R \) denotes a hydrocarbon-based radical chosen from alkyl, arylalkyl, aryl, alkylaryl and cycloalkyl radicals, comprising from 8 to 30 carbon atoms, preferably 10 to 24 and even more particularly from 12 to 18 carbon atoms. A unit of formula (I) that is more particularly preferred is a unit in which \( R' \) denotes H, \( n \) is equal to 10, and \( R \) denotes a stearyl radical (C\(_{18}\)).

Anionic associative polymers of this type are described and prepared, according to an emulsion polymerization process, in patent EP-0 216 479.

Among these anionic associative polymers, those that are particularly preferred according to the invention are polymers formed from 20% to 60% by weight of acrylic acid and/or of methacrylic acid, from 5% to 60% by weight of \( \text{C}_1-\text{C}_4 \) alkyl (meth)acrylates, from 2% to 50% by weight of fatty-chain allyl ether of formula (I), and from 0 to 1% by weight of a crosslinking agent which is a well-known copolymerizable polyethylene unsaturated monomer, for instance diallyl phthalate, allyl (meth)acrylate, divinylbenzene, (poly)ethylene glycol dimethacrylate or methylenebisacrylamide.

Among the latter polymers, those most particularly preferred are crosslinked terpolymers of methacrylic acid, of ethyl acrylate and of polyethylene glycol (10 EO) stearyl alcohol ether (Steareth-10), in particular those sold by the company Ciba under the names Salcare SC 80® and Salcare SC 90®, which are aqueous 30% emulsions of a crosslinked terpolymer of methacrylic acid, of ethyl acrylate and of steareth-10 allyl ether (40/50/1 0);

- (II) those comprising at least one hydrophilic unit of unsaturated olefinic carboxylic acid type, and at least one hydrophobic unit of the type such as a \((\text{C}_9-\text{C}_{30})\) alkyl ester of an unsaturated carboxylic acid.

These polymers are preferably chosen from those in which the hydrophilic unit of unsaturated olefinic carboxylic acid type corresponds to the monomer having the following formula (II):

\[ \text{CH}_2 \quad \text{H} \quad \text{OH} \]  

in which \( R_1 \) denotes H or CH\(_3\) or C\(_5\)H\(_5\), i.e. acrylic acid, methacrylic acid or ethacrylic acid units, and of which the hydrophobic unit of the type such as a (C\(_{10}\)-C\(_{30}\)) alkyl ester of an unsaturated carboxylic acid corresponds to the monomer having the following formula (III):

\[ \text{CH}_2 \quad \text{R} \quad \text{OH} \]
in which \( R_2 \) denotes H or \( \text{CH}_3 \) or \( \text{C}_2\text{H}_5 \) (i.e. acrylate, methacrylate or ethacrylate units) and preferably H (acrylate units) or \( \text{CH}_3 \) (methacrylate units), \( R_3 \) denoting a C\(_{10-30}\) and preferably C\(_{12-22}\) alkyl radical.

(C10-C30) alkyl esters of unsaturated carboxylic acids according to the invention include, for example, lauryl acrylate, stearyl acrylate, decyl acrylate, isodecyl acrylate and dodecyl acrylate, and the corresponding methacrylates, lauryl methacrylate, stearyl methacrylate, decyl methacrylate, isodecyl methacrylate and dodecyl methacrylate.

Anionic polymers of this type are described and prepared, for example, according to patents US 3 915 921 and US 4 509 949.

Among the anionic associative polymers of this type that will be used more particularly are polymers formed from a monomer mixture comprising:

(i) essentially acrylic acid,

(ii) an ester of formula (III) described above in which \( R_2 \) denotes H or \( \text{CH}_3 \), \( R_3 \) denoting an alkyl radical containing from 12 to 22 carbon atoms,

(iii) and a crosslinking agent, which is a well-known copolymerizable polyethylenic unsaturated monomer, such as diallyl phthalate, allyl (meth)acrylate, divinylbenzene, (poly)ethylene glycol dimethacrylate or methylenebisacrylamide.

Among anionic associative polymers of this type, use will more particularly be made of those consisting of from 95% to 60% by weight of acrylic acid (hydrophilic unit), 4% to 40% by weight of C\(_{10-30}\) alkyl acrylate (hydrophobic unit) and 0 to 6% by weight of crosslinking polymerizable monomer, or alternatively those consisting of from 98% to 96% by weight of acrylic acid (hydrophilic unit), 1% to 4% by weight of C\(_{10-30}\) alkyl acrylate (hydrophobic unit) and 0.1% to 0.6% by weight of crosslinking polymerizable monomer such as those described previously.

Among said above polymers, those very particularly preferred according to the present invention are the products sold by the company Lubrizol under the trade names Pemulen TR1\textsuperscript{®}, Pemulen TR2\textsuperscript{®} and Carbopol 1382\textsuperscript{®}, and more preferentially still Pemulen TR1\textsuperscript{®}, and the product sold by the company SEPPIC under the name Coatex SX\textsuperscript{®}:

- (III) maleic anhydride/C3o-C38 \( \alpha\beta \)-olefin/alkyl maleate terpolymers, such as the product (maleic anhydride/C3o-C38 \( \alpha\beta \)-olefin/isopropyl maleate copolymer) sold under the name Performa V 1608\textsuperscript{®} by the company Newphase Technologies;

- (IV) acrylic terpolymers comprising:

(a) approximately 20% to 70% by weight of an \( \alpha\beta \)-monoethylenically unsaturated carboxylic acid,
(b) approximately 20% to 80% by weight of a non-surfactant \( \alpha,\beta \)-monoethylenically unsaturated monomer different from (a),

(c) approximately 0.5% to 60% by weight of a non-ionic monourethane which is the reaction product of a monohydric surfactant with a monoethylenically unsaturated monoisocyanate,

such as those described in patent application EP-A-0 173 109 and more particularly the terpolymer described in Example 3, namely a methacrylic acid/methyl acrylate/behenyl alcohol dimethyl-meta-isopropenyl benzyl isocyanate ethoxylated (40 EO) terpolymer, as an aqueous 25% dispersion;

-\( \alpha,\beta \)-copolymers comprising, among their monomers, an \( \alpha,\beta \)-monoethylenically unsaturated carboxylic acid and an ester of an \( \alpha,\beta \)-monoethylenically unsaturated carboxylic acid and of an oxyalkylenated fatty alcohol.

Preferentially, these compounds also comprise, as monomer, an ester of an \( \alpha,\beta \)-monoethylenically unsaturated carboxylic acid and of a \( \text{Ci-C}_4 \) alcohol.

Examples of a compound of this type that may be mentioned are Aculyn 22® and Aculyn 88® sold by the company Rohm & Haas, which are methacrylic acid/ethyl acrylate/oxyalkylenated stearyl methacrylate terpolymers.

Mention may also be made of Synthalen W400 sold by the company 3V-Sigma, which is an acrylate copolymer as an aqueous emulsion, and Synthalen W2000 sold by the company 3V-Sigma, which is a polyoxyethylated (25 EO) acrylic/ \( \text{Ci2-C}_4 \) alkyl acrylate copolymer as an aqueous emulsion.

Mention may also be made of the product Structure 2001 sold by the company Akzo Nobel, which is an oxyethylenated (20 EO) acrylic acid/monostearyl itaconate copolymer as an aqueous 30% dispersion.

Mention will also be made of the products sold by the company Lubrizol under the commercial references Carbopol Ultrez 21, which is an acrylic polymer (acrylates/\( \text{Ci0-30} \) alkyl acrylate crosspolymer) and Novethix L-10, which is an acrylates/beheneth-25 methacrylate copolymer.

According to the invention, the associative polymers of non-ionic type are preferably chosen from:

- (1) celluloses modified with groups comprising at least one fatty chain.

Examples that may be mentioned include:

- hydroxyethylcelluloses modified with groups comprising at least one fatty chain, such as alkyl, arylalkyl or alkylaryl groups, or mixtures thereof, and in which the alkyl groups are preferably \( \text{C8-C22} \) alkyl groups, such as the product Natrosol Plus Grade 330 CS® (\( \text{C16} \) alkyls) sold by the company Aqualon, or the product Bermocoll EHM 100® sold by the company Berol Nobel,

- those modified with alkylphenyl polyalkylene glycol ether groups, such as the product Amercell Polymer HM-1500® (polyethylene glycol (15) nonylphenyl ether) sold by the company Amerchol,

- (2) hydroxypropyl guars modified with groups comprising at least one fatty chain, such as the product Esaflor HM 22® (\( \text{C22} \) alkyl chain) sold by the
company Lamberti, and the products RE21 0-1 8® (C₁₄ alkyl chain) and RE205-1® (C₂₀ alkyl chain) sold by the company Rhodia Chimie,

- (3) inulins modified with groups comprising at least one fatty chain, such as alkyl carbamate inulins and in particular the lauryl carbamate inulin sold by the company Orafti under the name Inutec SP1,

- (4) copolymers of vinylpyrrolidone and of fatty-chain hydrophobic monomers; examples that may be mentioned include:
  - the products Antaron V21 6® or Ganex V21 6® (vinylpyrrolidone/hexadecene copolymer) sold by the company I.S.P.,
  - the products Antaron V220® or Ganex V220® (vinylpyrrolidone/eicosene copolymer) sold by the company I.S.P.,
  - (5) copolymers of C₁-C₆ alkyl methacrylates or acrylates and of amphiphilic monomers comprising at least one fatty chain, such as, for example, the oxyethylenated methyl acrylate/stearyl acrylate copolymer sold by the company Goldschmidt under the name Antil 208®,
  - (6) copolymers of hydrophilic methacrylates or acrylates and of hydrophobic monomers comprising at least one fatty chain, such as, for example, the polyethylene glycol methacrylate/lauryl methacrylate copolymer,
  - (7) polyurethane polyethers comprising in their chain both hydrophilic blocks usually of polyoxyethylenated nature and hydrophobic blocks, which may be aliphatic sequences alone and/or cycloaliphatic and/or aromatic sequences,
  - (8) polymers with an aminoplast ether backbone containing at least one fatty chain, such as the Pure Thix® compounds sold by the company Sud-Chemie.

Preferably, the polyurethane polyethers comprise at least two hydrocarbon-based lipophilic chains containing from 6 to 30 carbon atoms, separated by a hydrophilic block, the hydrocarbon-based chains possibly being pendent chains or chains at the end of the hydrophilic block. In particular, it is possible for one or more pendent chains to be envisaged. In addition, the polymer may comprise a hydrocarbon-based chain at one end or at both ends of a hydrophilic block.

The polyurethane polyethers may be multiblock, in particular in triblock form. The hydrophobic blocks may be at each end of the chain (for example: triblock copolymer containing a hydrophilic central block) or distributed both at the ends and in the chain (for example multiblock copolymer). These same polymers may also be graft polymers or star polymers.

The non-ionic fatty-chain polyurethane polyethers may be triblock copolymers in which the hydrophilic block is a polyoxyethylenated chain comprising from 50 to 1000 oxyethylene groups. The non-ionic polyurethane polyethers comprise a urethane bond between the hydrophilic blocks, whence arises the name.
By extension, also included among the non-ionic fatty-chain polyurethane polyethers are those in which the hydrophilic blocks are linked to the lipophilic blocks via other chemical bonds.

As examples of non-ionic fatty-chain polyurethane polyethers that may be used in the invention, it is also possible to use Rheolate FX 1100 (Steareth-100/PEG 136/HDI copolymer), Rheolate 205® containing a urea function, sold by the company Elementis, or Rheolate® 208, 204 or 212, and also Acrysol RM 184®.

Mention may also be made of the product Elfacos T21 0® containing a C12-c14 alkyl chain, and the product Elfacos T21 2® containing a C18 alkyl chain, from Akzo.

The product DW 1206B® from Rohm & Haas containing a C20 alkyl chain and a urethane bond, sold at a solids content of 20% in water, may also be used.

It is also possible to use solutions or dispersions of these polymers, in particular in water or in aqueous-alcoholic medium. Examples of such polymers that may be mentioned are Rheolate 255, Rheolate 278 and Rheolate 244 sold by the company Elementis. The products DW 1206F and DW 1206J sold by the company Rohm & Haas may also be used.

The polyurethane polyethers that may be used according to the invention are in particular those described in the article by G. Fonnum, J. Bakke and Fk. Hansen - Colloid Polym. Sci 271, 380.389 (1993).

More particularly still, according to the invention, it is also possible to use a polyurethane polyether that may be obtained by polycondensation of at least three compounds comprising (i) at least one polyethylene glycol comprising from 150 to 180 mol of ethylene oxide, (ii) stearyl alcohol or decyl alcohol, and (iii) at least one diisocyanate.

Such polyurethane polyethers are sold especially by Rohm & Haas as Aculyn 46® and Aculyn 44® [Aculyn 46® is a polycondensate of polyethylene glycol containing 150 or 180 mol of ethylene oxide, of stearyl alcohol and of methylenebis(4-cyclohexyl isocyanate) (SMDI), at 15% by weight in a matrix of maltodextrin (4%) and water (81%); Aculyn 44® is a polycondensate of polyethylene glycol containing 150 or 180 mol of ethylene oxide, of decyl alcohol and of methylenebis(4-cyclohexylisocyanate) (SMDI), at 35% by weight in a mixture of propylene glycol (39%) and water (26%)].

According to one preferred embodiment of the invention, the associative polymer(s) is (are) chosen from anionic associative polymers. Even more preferentially, the associative polymers are chosen from oxyalkylated methacrylic acid/ethyl acrylate/stearl methacrylate terpolymers.

According to another embodiment of the invention, the associative polymers are non-ionic fatty-chain polyurethane polyethers.

The associative polymer(s) of the composition is (are) present in a concentration ranging from 0.01% to 30% by weight, preferably in a
concentration ranging from 0.1 % to 20% by weight and even more preferably ranging from 0.5% to 10% by weight of the total weight of the composition.

All the anionic and non-ionic fixing polymers and mixtures thereof used in the art may be used in the compositions according to the present application.

The fixing polymers may be soluble in the composition or insoluble in this same medium and used in this case in the form of dispersions of solid or liquid particles of polymer (latex or pseudolatex).

The anionic fixing polymers generally used are polymers comprising groups derived from carboxylic acid, sulfonic acid or phosphoric acid and have a number-average molecular weight of between approximately 500 and 5 000 000.

The anionic fixing polymers containing carboxylic groups that are preferred according to the invention are:

A) copolymers of acrylic acid and of acrylamide sold in the form of their sodium salts under the names Reten 421, 423 or 425 by the company Hercules, the sodium salts of polyhydroxycarboxylic acids;

B) copolymers of acrylic or methacrylic acid with a monoethylenic monomer such as ethylene, styrene, vinyl esters, acrylic or methacrylic acid esters, optionally grafted onto a polyalkylene glycol such as polyethylene glycol and optionally crosslinked. Such polymers are described in particular in French patent 1 222 944 and German patent application 2 330 956, the copolymers of this type comprising an optionally N-alkylated and/or hydroxyalkylated acrylamide unit in their chain as described in particular in Luxembourg patent applications 75370 and 75371 or sold under the name Quadramer by the company American Cyanamid. Mention may also be made of the acrylic acid/ethyl acrylate/N-terf-butylacrylamide terpolymers such as Ultrahold Strong sold by the company BASF. Mention may also be made of copolymers of acrylic acid and of C4 alkyl methacrylate and terpolymers of vinylpyrrolidone, of acrylic acid and of C7-C8 alkyl, for example lauryl, methacrylate, such as the product sold by the company ISP under the name Acrylidone® LM and methacrylic acid/ethyl acrylate/tert-butyl acrylate terpolymers such as the product sold under the name Luvimer® 100 P by the company BASF. Mention may also be made of acrylate/acrylate hydroxy ester copolymers, such as Acudyne 180 sold by the company Dow Chemical.

Mention may also be made of methacrylic acid/acrylic acid/ethyl acrylate/methyl methacrylate copolymers as an aqueous dispersion, sold under the name Amerhold® DR 25 by the company Amerchol;

C) crotonic acid copolymers, such as those comprising vinyl acetate or propionate units in their chain and optionally other monomers such as allyl esters or methallyl esters, vinyl ether or vinyl ester of a linear or branched saturated carboxylic acid with a long hydrocarbon-based chain, such as those containing at least 5 carbon atoms, it being possible for these polymers optionally to be grafted or crosslinked, or alternatively another vinyl, allyl or methallyl ester monomer of an α- or β-cyclic carboxylic acid. Such polymers are
described, inter alia, in French patents No. 1 222 944, 1 580 545, 2 265 782, 2 265 781, 1 564 110 and 2 439 798. Commercial products which come within this category are the resins 28-29-30, 26-13-14 and 28-13-10, sold by the company Akzo Nobel;

D) copolymers of C₄-Cs monounsaturated carboxylic acids or anhydrides chosen from:
- copolymers comprising (i) one or more maleic, fumaric or itaconic acids or anhydrides and (ii) at least one monomer chosen from vinyl esters, vinyl ethers, vinyl halides, phenylvinyl derivatives, acrylic acid and its esters, the anhydride functions of these copolymers optionally being monoesterified or monoamidated. Such polymers are described, in particular, in US patents 2 047 398, 2 723 248 and 2 102 113, and GB patent 839 805. Commercial products are especially those sold under the names Gantrez® AN or ES by the company ISP;

- copolymers comprising (i) one or more maleic, citraconic or itaconic anhydride units and (ii) one or more monomers chosen from allyl or methallyl esters optionally comprising one or more acrylamide, methacrylamide, a-olefin, acrylic ester, methacrylic ester, acrylic acid, methacrylic acid or vinylpyrrolidone groups in their chain, the anhydride functions of these copolymers optionally being monoesterified or monoamidated.

These polymers are described, for example, in French patents 2 350 384 and 2 357 241 by the Applicant;

E) polycrylamides comprising carboxylate groups;

F) homopolymers and copolymers comprising sulfonic groups, such as polymers comprising vinylsulfonic, styrenesulfonic, naphthalenesulfonic or acrylamidoalkylsulfonic units.

These polymers can be chosen in particular from:
- polyvinylsulfonic acid salts having a molecular weight of approximately between 1000 and 100 000, and also the copolymers with an unsaturated comonomer such as acrylic or methacrylic acids and their esters, and also acrylamide or its derivatives, vinyl ethers and vinylpyrrolidone;
- polystyrenesulfonic acid salts such as the sodium salts that are sold for example under the names Flexan® 500 and Flexan® 130 by Akzo Nobel. These compounds are described in patent FR 2 198 719;
- polyacrylamidesulfonic acid salts, such as those mentioned in patent US 4 128 631 and more particularly polyacrylamidoethylpropanesulfonic acid sold under the name Cosmedia Polymer HSP 1180 by Henkel.

As another anionic fixing polymer that can be used according to the invention, mention may be made of the branched block anionic polymer sold under the name Fixate G-1 00 L by the company Lubrizol.

According to the invention, the anionic fixing polymers are preferably chosen from copolymers of acrylic acid or of acrylic esters, such as the acrylic acid/ethyl acrylate/N-tert-butylacrylamide terpolymers sold especially under the
name Ultrahold® Strong by the company BASF, copolymers derived from crotonic acid, such as vinyl acetate/vinyl tert-butylbenzoate/crotonic acid terpolymers and the crotonic acid/vinyl acetate/vinyl neododecanoate terpolymers sold especially under the name Resin 28-29-30 by the company Akzo Nobel, polymers derived from maleic, fumaric or itaconic acids or anhydrides with vinyl esters, vinyl ethers, vinyl halides, phenylvinyl derivatives and acrylic acid and esters thereof, such as the methyl vinyl ether/monoesterified maleic anhydride copolymers sold, for example, under the name Gantrez® by the company ISP, the copolymers of methacrylic acid and of methyl methacrylate sold under the name Eudragit® L by the company Rohm Pharma, the copolymers of methacrylic acid and of ethyl acrylate sold under the name Luvimer® MAEX or MAE by the company BASF, the vinyl acetate/crotonic acid copolymers sold under the name Luviset CA 66 by the company BASF, the vinyl acetate/crotonic acid copolymers grafted with polyethylene glycol sold under the name Aristoflex® A by the company BASF, and the polymer sold under the name Fixate G-1 00 L by the company Lubrizol.

The non-ionic fixing polymers that may be used according to the present invention are chosen, for example, from:
- polyalkyloxazolines;
- vinyl acetate homopolymers;
- vinyl acetate copolymers, for instance copolymers of vinyl acetate and of acrylic ester; copolymers of vinyl acetate and of ethylene, or copolymers of vinyl acetate and of maleic ester, for example of dibutyl maleate;
- homopolymers and copolymers of acrylic esters, for instance copolymers of alkyl acrylates and of alkyl methacrylates, such as the products sold by the company Rohm & Haas under the names Primal® AC-261 K and Eudragit® NE 30 D, by the company BASF under the name 8845, or by the company Hoechst under the name Appretan® N9212;
- copolymers of acrylonitrile and of a non-ionic monomer chosen, for example, from butadiene and alkyl (meth)acrylates; mention may be made of the products sold under the name CJ 0601 B by the company Rohm & Haas;
- styrene homopolymers;
- styrene copolymers, for instance copolymers of styrene and of an alkyl (meth)acrylate, such as the products Mowilith® LDM 691 1, Mowilith® DM 611 and Mowilith® LDM 6070 sold by the company Hoechst, and the products Rhodopas® SD 215 and Rhodopas® DS 910 sold by the company Rhone-Poulenc; copolymers of styrene, of alkyl methacrylate and of alkyl acrylate; copolymers of styrene and of butadiene; or copolymers of styrene, of butadiene and of vinylpyridine;
- polyamides;
- vinyl lactam homopolymers such as vinylpyrrolidone homopolymers and such as the polyvinylcaprolactam sold under the name Luviskol® Plus by the company BASF; and
- vinyl lactam copolymers such as a poly(vinylpyrrolidone/vinyl lactam) copolymer sold under the trade name Luvitec® VPC 55K65W by the company BASF, poly(vinylpyrrolidone/vinyl acetate) copolymers, such as those sold under the name PVPVA® S630L by the company ISP, Luviskol® VA 73, VA 64, VA 55, VA 37 and VA 28 by the company BASF; and poly(vinylpyrrolidone/vinyl propionate) terpolymers, for instance the product sold under the name Luviskol® VAP 343 by the company BASF;
- non-hydrolysed polyvinylformamide polymers, such as the product sold under the name Lupamin 9000 by the company BASF.

The alkyl groups of the abovementioned non-ionic polymers preferably have from 1 to 6 carbon atoms.

The anionic or non-ionic fixing polymer(s) of the present invention is (are) present in a concentration ranging from 0.1 % to 40%, preferentially ranging from 0.5 % to 25% and even more preferentially ranging from 1% to 10% by weight of the total weight of the composition.

The surfactants of the composition according to the invention are of anionic, cationic, amphoteric or zwitterionic type. The surfactants may be linear or branched.

Within the meaning of the present invention, the term "surfactants" is intended to mean any compound that reduces the surface tension of a liquid and in particular of water at 25°C, the chemical structure of which a) does not involve a polymerization reaction or b) involves only the sole polymerization of an alkylene oxide and/or a glycidol oxide.

The term "anionic surfactant" is intended to mean a surfactant comprising, as ionic or ionizable groups, only anionic groups. These anionic groups are preferably chosen from the groups -C(O)OH, -C(O)O-, -SO_3H, -S(O)_2O-, -OS(O)_2OH, -OS(O)O-, -P(O)OH_2, -P(O)O_2-, -P(O)O_2-, =P(O)OH, -P(OH)O-, =P(O)O-, =POH, =PO-, the anionic parts comprising a cationic counterion such as an alkali metal, an alkaline-earth metal or an ammonium.

As examples of anionic surfactants that may be used in the composition according to the invention, mention may be made of alkyl sulfates, alkyl ether sulfates, alkylamido ether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, alkyl sulfonates, alkyamide sulfonates, alkylaryl sulfonates, a-olefin sulfonates, paraffin sulfonates, alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkyamide sulfosuccinates, alkyl sulfoacetates, acyl sarcosinates, acyl glutamates, alkyl sulfosuccinamates, acyl isethionates and N-acyl taurates, salts of alkyl monoesters of polyglycoside-polycarboxylic acids, acyl lactylates, D-galactosiduronic acid salts, alkyl ether carboxylic acid salts, alkylaryl ether carboxylic acid salts, alkylamido ether carboxylic acid salts; and the corresponding non-salified forms of all these compounds; the alkyl and acyl groups of all these compounds comprising from 6 to 24 carbon atoms and the aryl group denoting a phenyl group.
These compounds can be oxyethylenated and then preferably comprise from 1 to 50 ethylene oxide units.

The salts of C₆-C₂₄ alkyl monoesters of polyglycoside-polycarboxylic acids can be chosen from C₆-C₂₄ alkyl polyglycoside-citrates, C₆-C₂₄ alkyl polyglycoside-tartrates and C₆-C₂₄ alkyl polyglycoside-sulfosuccinates.

When the anionic surfactant(s) are in salt form, they may be chosen from alkali metal salts such as the sodium or potassium salt and preferably the sodium salt, ammonium salts, amine salts and in particular aminoalcohol salts or alkaline-earth metal salts such as the magnesium salts.

Examples of aminoalcohol salts that may especially be mentioned include monoethanolamine, diethanolamine and triethanolamine salts, monoisopropanolamine, diisopropanolamine or triisopropanolamine salts, 2-amino-2-methyl-1-propanol salts, 2-amino-2-methyl-1,3-propanediol salts and tris(hydroxymethyl)aminomethane salts.

Alkali metal or alkaline-earth metal salts, and in particular sodium or magnesium salts, are preferably used.

Among the anionic surfactants mentioned, use is preferably made of (C₆-C₂₄)alkyl sulfates, (C₆-C₂₄)alkyl ether sulfates comprising from 2 to 50 ethylene oxide units, especially in the form of alkali metal, ammonium, aminoalcohol and alkaline-earth metal salts, or a mixture of these compounds.

In particular, use is preferably made of (C₁₂-C₂₀)alkyl sulfates, (C₁₂-C₂₀)alkyl ether sulfates comprising from 2 to 20 ethylene oxide units, especially in the form of alkali metal, ammonium, aminoalcohol and alkaline-earth metal salts, or a mixture of these compounds. Better still, it is preferable to use sodium lauryl ether sulfate comprising 2.2 mol of ethylene oxide.

The amphoteric or zwitterionic surfactant(s), which is (are) preferably (a) non-silicone surfactant(s), which can be used in the present invention can in particular be derivatives of optionally quaternized secondary or tertiary aliphatic amines, in which derivatives the aliphatic group is a linear or branched chain comprising from 8 to 22 carbon atoms, said amine derivatives comprising at least one anionic group, such as, for example, a carboxylate, sulfonate, sulfate, phosphate or phosphonate group. Mention may be made in particular of (C₆-C₂₀)alkylbetaines, sulfobetaines, (C₈-C₂₀)alkylamido(C₃-C₈)alkylbetaines and (C₈-C₂₀)alkylamido(C₆-C₈)alkylsulfobetaines.

Among the optionally quaternized secondary or tertiary aliphatic amine derivatives that can be used, as defined above, mention may also be made of the compounds of respective structures (A₁) and (A₂):

\[
\text{Ra-C(O)-NH-CH}_2\text{-CH}_2\text{-N}^+(\text{Rb})(\text{Rc})\text{-CH}_2\text{C(O)O}-, \ M^+, \ X^- \quad (A₁)
\]

in which formula (A₁):
Ra represents a C10-C30 alkyl or alkenyl group derived from an acid Ra-COOH preferably present in hydrolysed coconut oil, or a heptyl, nonyl or undecyl group;
- Rb represents a beta-hydroxyethyl group; and
- Rc represents a carboxymethyl group;
- M⁺ denotes a cationic counterion derived from an alkali metal or alkaline-earth metal, such as sodium, an ammonium ion or an ion derived from an organic amine, and
  - X⁻ represents an organic or inorganic anionic counterion, such as that chosen from halides, acetates, phosphates, nitrates, (Cl-C₄)alkyl sulfates, (Ci-C₄)alkylsulfonates or (Cl-C₄)alkylarylsulfonates, in particular methyl sulfate and ethyl sulfate; or alternatively M⁺ and X⁻ are absent;

\[
\text{Ra}^\cdot\text{C(O)}\cdot\text{NH}_2\cdot\text{CH}_2\cdot\text{N(B)}^{	ext{(B')} \ (A2)}
\]

in which formula (A2):
- B represents the group -CH₂-CH₂-O-X⁻;
- B⁺ represents the group -(CH₂)zY⁺, with z = 1 or 2;
- X⁺ represents the group -CH₂-C(O)OH, -CH₂-C(O)OZ⁺, -CH₂-CH₂-C(O)OH or -CH₂-CH₂-C(O)OZ⁺, or a hydrogen atom;
- Y represents the group -C(O)OH, -C(O)OZ⁺, -CH₂-CH(OH)-SO₃H or the group -CH₂-CH(OH)-SO₃⁺Z⁺;
- Z⁺ denotes a cationic counterion derived from an alkali metal or alkaline-earth metal, such as sodium, an ammonium ion or an ion derived from an organic amine;

- Ra' represents a C10-C30 alkyl or alkenyl group of an acid Ra''-C(O)OH preferably present in coconut oil or in hydrolysed linseed oil, an alkyl group, in particular a C17 alkyl group, and its iso form, or an unsaturated C17 group.

These compounds are classified in the CTFA dictionary, 5th edition, 1993, under the names disodium cocoamphodiacetate, disodium lauroamphodiacetate, disodium caprylamphodiacetate, disodium capryloamphodiacetate, disodium cocoamphodipropionate, disodium lauroamphodipropionate, disodium caprylamphodipropionate, disodium capryloamphodipropionate, lauroamphodipropionic acid and cocoamphodipropionic acid.

Mention may be made, by way of example, of the cocoamphodiacetate sold by the company Rhodia under the trade name Miranol® C2M Concentrate.

Among the amphoteric or zwitterionic surfactants mentioned above, use is preferably made of (C8-C₂₀)alkylbetaines such as cocobetaine, (Cs-C₂₀)alkylamido(C3-C₈)alkylbetaines such as cocamidopropylbetaine, and mixtures thereof. More preferentially, the amphoteric or zwitterionic surfactant(s) is (are) chosen from cocamidopropylbetaine and cocobetaine.
The cationic surfactant(s) which can be used in the composition according to the invention comprise(s), for example, salts of optionally polyoxyalkylated primary, secondary or tertiary fatty amines, quaternary ammonium salts, and their mixtures.

Examples of quaternary ammonium salts that may especially be mentioned include:

- those corresponding to the general formula (A3) below:

\[
\begin{array}{c}
\overset{R_8}{N} \overset{R_{10}}{ \overset{R_9}{N}} \overset{R_{11}}{N} \\
\end{array} \\
X^-
\]

(A3)

in which formula (A3):

- \( R_s \) to \( R_n \), which may be identical or different, represent a linear or branched aliphatic group comprising from 1 to 30 carbon atoms, or an aromatic group such as aryl or alkylaryl, it being understood that at least one of the groups \( R_s \) to \( R_n \) comprises from 8 to 30 carbon atoms and preferably from 12 to 24 carbon atoms; and

- \( X^- \) represents an organic or inorganic anionic counterion, such as that chosen from halides, acetates, phosphates, nitrates, \((\text{C}_1-\text{C}_4)\)alkyl sulfates, \((\text{C}_1-\text{C}_4)\)alkylsulfonates or \((\text{C}_1-\text{C}_4)\)alkylaryl sulfonates, in particular methyl sulfate and ethyl sulfate.

The aliphatic groups of \( R_s \) to \( R_n \) may also comprise heteroatoms such as in particular oxygen, nitrogen, sulfur, and halogens.

The aliphatic groups of \( R_s \) to \( R_n \) are chosen, for example, from \( \text{C}_1-\text{C}_{30} \) alkyl, \( \text{C}_1-\text{C}_{30} \) alkoxy, polyoxy \((\text{C}_2-\text{C}_e)\)alkylene, \( \text{C}_1-\text{C}_{30} \) alkylamide, \((\text{C}_{12}-\text{C}_{22})\)alkylamido \((\text{C}_2-\text{C}_e)\)alkyl, \((\text{C}_{12}-\text{C}_{22})\)alkylacetate, \( \text{C}_1-\text{C}_{30} \) hydroxyalkyl, \( X^- \) is an anionic counterion chosen from halides, phosphates, acetates, lactates, \((\text{C}_1-\text{C}_4)\)alkyl sulfates, and \((\text{C}_1-\text{C}_4)\)alkylsulfonates or \((\text{C}_1-\text{C}_4)\)alkylaryl sulfonates.

Preference is given, among the quaternary ammonium salts having the formula (A3), firstly, to tetraalkylammonium chlorides, such as, for example, dialkyldimethylammonium or alkyldimethylammonium chlorides in which the alkyl group includes approximately from 12 to 22 carbon atoms, in particular behenyltrimethylammonium chloride, distearyldimethylammonium chloride, cetyltrimethylammonium chloride, benzyltrimethylstearylammonium chloride, or else, secondly, distearoylethylhydroxyethylmethy lammonium methosulfate, dipalmitoylethylhydroxyethylammonium methosulfate or distearoylethylhydroxyethylammonium methosulfate, or else, lastly, palmitylamidopropyltrimethylammonium chloride or stearamidopropyl(dimethyl(myristyl acetate)ammonium chloride, sold as Ceraphyl® 70 by Van Dyk;
quaternary ammonium salts of imidazoline, for instance those having formula (A4) below:

\[
\begin{array}{c}
\text{CH}_2\text{CH}_2\text{N}(\text{R}_{15})\text{CO}\text{-R}_{12} \\
\text{R}_{13}
\end{array}
\]

(A4)
in which formula (A4):

- \( \text{Ri2} \) represents an alkenyl or alkyl group comprising from 8 to 30 carbon atoms, for example tallow fatty acid derivatives;
- \( \text{Ri3} \) represents a hydrogen atom, a \( \text{C}_4 \) alkyl group or an alkenyl or alkyl group containing from 8 to 30 carbon atoms;
- \( \text{Ri4} \) represents a \( \text{C}_4 \) alkyl group;
- \( \text{Ri5} \) represents a hydrogen atom or a \( \text{C}_4 \) alkyl group;
- \( X^- \) represents an organic or inorganic anionic counterion, such as that chosen from halides, phosphates, acetates, lactates, \( \text{(C}_4 \text{C}_4) \text{alkyl sulfates, (C}_4 \text{C}_4) \text{alkylsulfonates or (C}_4 \text{C}_4) \text{alkylarylsulfonates.} \)

\( \text{Ri2} \) and \( \text{Ri3} \) preferably denote a mixture of alkyl or alkenyl groups comprising from 12 to 21 carbon atoms, for example tallow fatty acid derivatives, \( \text{Ri4} \) denotes a methyl group, and \( \text{Ri5} \) denotes a hydrogen atom. Such a product is sold, for example, under the name Rewoquat® W 75 by the company Rewo;

- di- or triquaternary ammonium salts, in particular having formula (A5) below:

\[
\begin{array}{c}
\text{R}_{17} \\
\text{R}_{16} \text{-(CH}_2)_3\text{-N}^+\text{(Ri6a)(Ri7a)(Ri8a)} \text{X}^- \\
\text{R}_{18} \\
\text{R}_{19}
\end{array}
\]

(A5)
in which formula (A5):

- \( \text{Ri6} \) denotes an alkyl group comprising approximately from 16 to 30 carbon atoms, which is optionally hydroxylated and/or interrupted with one or more oxygen atoms;
- \( \text{Ri7} \) is chosen from hydrogen, an alkyl group comprising from 1 to 4 carbon atoms or a group \(-(\text{CH}_2)_3\text{-N}^+\text{(Ri6a)(Ri7a)(Ri8a)} \text{X}^- \);\n- \( \text{Ri6a, Ri7a, Ri8a, R18, R19, R20 and R21, which may be identical or different, are chosen from hydrogen and an alkyl group comprising from 1 to 4 carbon atoms; and} \)
- \( \text{X}^- \), which may be identical or different, represents an organic or inorganic anionic counterion, such as that chosen from halides, acetates, phosphates, nitrates, \( \text{(C}_4 \text{C}_4) \text{alkyl sulfates, (C}_4 \text{C}_4) \text{alkylsulfonates or (C}_4 \text{C}_4) \text{alkylarylsulfonates, in particular methyl sulfate and ethyl sulfate.} \)
Such compounds are, for example, Finquat CT-P, provided by Finetex (Quaternium 89), or Finquat CT, provided by Finetex (Quaternium 75);
- quaternary ammonium salts comprising one or more ester functional groups, such as those of following formula (A6):

\[
\begin{align*}
R_{24} & & O \\
& & \bigg[ O & \bigg\{ \bigg\text{C}_{12}(\text{OH})_1\bigg\}_r \bigg\text{N}
& & \bigg\{ \bigg\text{C}_{12}(\text{OH})_1\bigg\}_s \bigg\} \bigg\text{O} & - R_{23} \\
& & \bigg[ & \bigg\{ \bigg\text{C}_{24} \bigg\}_t \bigg\text{R}_{25} \\
& & X & - \bigg( \bigg\text{C}_{4} \bigg\}_2 \bigg\text{R}_{26} \bigg]
\end{align*}
\]

(A6)

in which formula (A6):
- \(R_{22}\) is chosen from \(\text{C}1-\text{C}-6\) alkyl and \(\text{C}1-\text{C}-6\) hydroxyalkyl or dihydroxyalkyl groups,
- \(R_{23}\) is chosen from:

\[
\begin{align*}
\text{O} & \\
\text{R}_{24} & \bigg[ O \bigg\{ \bigg\text{C}_{12}(\text{OH})_1\bigg\}_r \bigg\text{N}
& & \bigg\{ \bigg\text{C}_{12}(\text{OH})_1\bigg\}_s \bigg\} \bigg\text{O} & - R_{23} \\
& & \bigg[ & \bigg\{ \bigg\text{C}_{24} \bigg\}_t \bigg\text{R}_{25} \\
& & X & - \bigg( \bigg\text{C}_{4} \bigg\}_2 \bigg\text{R}_{26} \bigg]
\end{align*}
\]
- the group \(\text{R}_{26} - \text{C}\),
- linear or branched, saturated or unsaturated \(\text{C}1-\text{C}22\) hydrocarbon-based groups \(R_{27}\),
- a hydrogen atom,
- \(R_{25}\) is chosen from:

\[
\begin{align*}
\text{O} & \\
\text{R}_{28} & \bigg[ O \bigg\{ \bigg\text{C}_{12}(\text{OH})_1\bigg\}_r \bigg\text{N}
& & \bigg\{ \bigg\text{C}_{12}(\text{OH})_1\bigg\}_s \bigg\} \bigg\text{O} & - R_{23} \\
& & \bigg[ & \bigg\{ \bigg\text{C}_{24} \bigg\}_t \bigg\text{R}_{25} \\
& & X & - \bigg( \bigg\text{C}_{4} \bigg\}_2 \bigg\text{R}_{26} \bigg]
\end{align*}
\]
- the group \(\text{R}_{28} - \text{C}\),
- linear or branched, saturated or unsaturated \(\text{C}1-\text{C}-6\) hydrocarbon-based groups \(R_{29}\),
- a hydrogen atom,
- \(R_{24}, R_{26}\) and \(R_{28}\), which may be identical or different, are chosen from linear or branched, saturated or unsaturated \(\text{C}7-\text{C}21\) hydrocarbon-based groups;
- \(r, s\) and \(t\), which may be identical or different, are integers having values from 2 to 6,
- \(r1 + t1\), which may be identical or different, have the value 0 or 1, with
- \(r2 + r1 = 2r\) and \(t1 + t2 = 2t\),
- \(y\) is an integer having a value from 1 to 10,
- \(x\) and \(z\), which may be identical or different, are integers ranging from 0 to 10,
- \(\text{X}\) denotes an organic or inorganic anionic counterion, with the proviso that the sum \(x + y + z\) is from 1 to 15, that when \(x\) is 0, then \(R_{23}\) denotes \(R_{27}\) and that when \(z\) is 0, then \(R_{25}\) denotes \(R_{29}\).
The alkyl groups \(R_{22}\) may be linear or branched, and more particularly linear.
Preferably, \(R_{22}\) denotes a methyl, ethyl, hydroxyethyl or dihydroxypropyl group, and more particularly a methyl or ethyl group.
Advantageously, the sum \(x + y + z\) is from 1 to 10.
When \( R_{2,3} \) is a hydrocarbon-based group \( R_{27} \), it may be long and may have from 12 to 22 carbon atoms, or may be short and may have from 1 to 3 carbon atoms.

When \( R_{25} \) is a hydrocarbon-based group \( R_{29} \), it preferably contains 1 to 3 carbon atoms.

Advantageously, \( R_{2,4} \), \( R_{26} \) and \( R_{28} \), which may be identical or different, are chosen from linear or branched, saturated or unsaturated \( C_{11}-C_{21} \) hydrocarbon-based groups, and more particularly from linear or branched, saturated or unsaturated \( C_{11}-C_{21} \) alkyl and alkenyl groups.

Preferably, \( x \) and \( z \), which may be identical or different, are equal to 0 or 1.

Advantageously, \( y \) is equal to 1. Preferably, \( r \), \( s \) and \( t \), which may be identical or different, are equal to 2 or 3, and even more particularly are equal to 2.

The anionic counterion \( X^- \) is preferably a halide, such as chloride, bromide or iodide; a \((C_i-C_j)\)alkyl sulfate or a \((C_i-C_j)\)alkylsulfonate or \((C_i-C_j)\)alkylaryl sulfonate. However, it is possible to use methanesulfonate, phosphate, nitrate, tosylate, an anion derived from an organic acid, such as acetate or lactate, or any other anion that is compatible with the ammonium containing an ester function.

The anionic counterion \( X^- \) is even more particularly chloride, methyl sulfate or ethyl sulfate.

Use is made more particularly in the composition according to the invention of the ammonium salts having formula (A6) in which:

- \( R_{22} \) denotes a methyl or ethyl group,
- \( x \) and \( y \) are equal to 1,
- \( z \) is equal to 0 or 1,
- \( r \), \( s \) and \( t \) are equal to 2,
- \( R_{23} \) is chosen from:
  - the group \( \text{R}^{25} \text{C} \)
  - methyl, ethyl or \( C_{14}-C_{22} \) hydrocarbon-based groups,
  - a hydrogen atom,
- \( R_{25} \) is chosen from:
  - the group \( \text{R}^{26} \text{C} \)
  - a hydrogen atom,
- \( R_{2,4} \), \( R_{26} \) and \( R_{28} \), which may be identical or different, are chosen from linear or branched, saturated or unsaturated \( C_{13}-C_{17} \) hydrocarbon-based groups, and preferably from linear or branched, saturated or unsaturated \( C_{13}-C_{17} \) alkyl and alkenyl groups.
Advantageously, the hydrocarbon-based radicals are linear.

Among the compounds of formula (A6), examples that may be mentioned include salts, especially the chloride or methyl sulfate, of diacyloxyethyltrimethylammonium, diacyloxyethylhydroxyethylmethylammonium, monoacyloxyethylhydroxyethylmethylammonium, triacyloxyethylmethylammonium or monoacyloxyethylhydroxyethyltrimethylammonium, and mixtures thereof. The acyl groups preferably have from 14 to 18 carbon atoms and originate more particularly from a vegetable oil, such as palm oil or sunflower oil. When the compound comprises several acyl groups, the latter can be identical or different.

These products are obtained, for example, by direct esterification of triethanolamine, triisopropanolamine, an alkyl diethanolamine or an alkyl diisopropanolamine, which are optionally oxyalkylenated, with fatty acids or with mixtures of fatty acids of vegetable or animal origin, or by transesterification of their methyl esters. This esterification is followed by a quaternization by means of an alkylating agent, such as an alkyl halide, preferably methyl or ethyl halide, a dialkyl sulfate, preferably dimethyl or diethyldimethylammonium, and mixtures thereof. The company Rewo-Witco.

Such compounds are sold, for example, under the names Dehyquart® by the company Henkel, Stepanquat® by the company Stepan, Noxamium® by the company Ceca or Rewoquat® WE 18 by the company Rewo-Witco.

The composition according to the invention may contain, for example, a mixture of quaternary ammonium monoester, diester and triester salts with a weight majority of diester salts.

It is also possible to use the ammonium salts containing at least one ester function that are described in patents US-A-4 874 554 and US-A-4 137 180.

Use may be made of behenylhydroxypropyltrimethylammonium chloride, provided by Kao under the name Quatarmin BTC 131.

Preferably, the ammonium salts containing at least one ester function contain two ester functions.

Among the cationic surfactants that may be present in the composition according to the invention, it is more particularly preferred to choose cetyltrimethylammonium, behenyltrimethylammonium and dipalmitoylethylhydroxyethylmethylammonium salts, and their mixtures, and more particularly behenyltrimethylammonium chloride, cetyltrimethylammonium chloride and dipalmitoylethylhydroxyethylammonium methosulfate, and their mixtures.

Preferably, the anionic, cationic or amphoteric surfactant(s) comprise(s) predominantly fatty chains containing from 8 to 14 carbon atoms.
The expression "fatty chain" should be understood according to the invention to mean, as for the associative polymers, an optionally hydroxylated, linear or branched alkyl or alkenyl chain having from 8 to 30, and preferably from 10 to 30, carbon atoms.

Surfactants are often mixtures of compounds having, in particular, different lengths of alkyl fatty chains.

The term "predominantly" is then understood to mean that, for the surfactant in question, the weight percentage of compounds having fatty chains ranging from $\text{C}_8$ to $\text{C}_4$ is greater than or equal to 50%.

In other words, the surfactants that can be used in the composition of the invention comprise a mixture of compounds having fatty chains of different lengths, which mixture comprises more than 50% of compounds having fatty chains ranging from $\text{C}_8$ to $\text{C}_4$.

The anionic, cationic or amphoteric surfactant(s) of the present invention is (are) present in a concentration greater than or equal to 2% by weight, preferably in a concentration ranging from 2% to 40%, preferentially from 2% to 25% and even more preferentially ranging from 4% to 10% by weight of the total weight of the composition.

The composition may be aqueous or anhydrous. It is preferably aqueous. It then preferably comprises from 5% to 97% of water, even more preferentially from 20% to 95% of water and better still from 50% to 90% of water.

The composition may comprise at least one organic solvent preferably chosen from $\text{Cl-C}_4$ lower alcohols, such as ethanol, isopropanol, tert-butanol or n-butanol; polyols, such as glycerol, propylene glycol and polyethylene glycols; acetone, propylene carbonate; benzyl alcohol, glycol ether derivatives; aminoethylpropanol, and mixtures thereof.

The pH of the compositions used according to the invention is generally between 1 and 13, preferably between 3 and 11 and even more preferentially between 6 and 9.

Preferentially, the composition according to the invention may contain active agents conventionally used in non-long-lasting hair shaping, other than those described previously, and chosen from non-ionic surfactants, cationic surfactants other than those of the invention, silicones, non-associative thickeners, cationic associative polymers, direct dyes, in particular cationic or natural direct dyes or oxidation dyes, organic or mineral pigments, UV-screening agents, fillers, in particular nacres, $\text{TiO}_2$, resins or clays, fragrances, peptizers, vitamins, amino acids, preservatives, agents for long-lasting hair shaping, in particular thiolated organic reducing agents, non-thiolated organic reducing agents, alkaline agents, etc.

Of course, those skilled in the art will take care to choose the optional additional compounds and/or the amounts thereof such that the advantageous properties of the compositions used according to the invention are not, or not substantially, detrimentally affected by the envisaged addition.
Preferably, the compositions are in the form of gels. Preferably, the compositions have a viscosity of greater than or equal to 4 Pa.s and better still ranging from 4 Pa.s to 500 Pa.s at a temperature of 25°C and at a shear rate of 1 s\(^{-1}\) (measurable, for example, with a Haake RS600 rheometer).

The composition according to the invention may especially be used as a leave-in application on the hair.

Another subject of the present invention is a process for treating keratin fibres such as the hair, comprising the application of a cosmetic composition according to the invention.

The invention is illustrated in more detail in the following examples, which are provided by way of illustration and without limitation of the invention.

**EXAMPLES**

The following hairstyling gel formulations according to the invention were prepared. The concentrations are expressed as weight percentages of active materials in the final composition.

<table>
<thead>
<tr>
<th>Compounds</th>
<th>Concentrations AM (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACRYLATES/STEARETH-20 METHACRYLATE CROSSTOPOLYMER(^{(a)})</td>
<td>1.95</td>
</tr>
<tr>
<td>N-VINYLFORMAMIDE (^{(b)})</td>
<td>1.2</td>
</tr>
<tr>
<td>Lauryl ether sulfate (^{(c)})</td>
<td>4.97</td>
</tr>
<tr>
<td>Sodium lauroyl sarcosinate (^{(d)})</td>
<td>5.01</td>
</tr>
<tr>
<td>Disodium cocoyl glutamate (^{(e)})</td>
<td>5.22</td>
</tr>
<tr>
<td>Aminomethypropanol</td>
<td>1.5</td>
</tr>
<tr>
<td>Water</td>
<td>QS</td>
</tr>
</tbody>
</table>

\(^{(a)}\) ACULYN 88 sold by the company DOW CHEMICAL

\(^{(b)}\) LUPAMIN 9000 sold by BASF

\(^{(c)}\) TEXAPON AOS 225 UP sold by the company COGNIS (BASF)

\(^{(d)}\) ORAMIX L 30 sold by the company SEPPIC

\(^{(e)}\) PLANTAPON ACG LC sold by the company COGNIS (BASF)

Protocol for application to locks of natural chestnut-brown hair of 2.7 g
1. Shampooing with Ultra Doux Camomille shampoo.
2. Rinsing with water, the temperature of the water being 38°C and the flow rate being 4 l/min, then removal of the shampoo by passing the fingers through 15 times under water.
3. Wringing out the locks by 2 passes between the fingers.
4. Applying 1 g of the formulation homogeneously along the wet lock.
5. Drying in the open air.

For each of the compositions according to the invention, the gel obtained is homogeneous and thick enough to enable quick and easy application of the composition to the hair. In addition, the product slides well in the hands and on the hair so as to obtain uniform distribution over the entire head of hair.

On application and after drying, significant shaping of the hair and hold of this shape are obtained (presence of hardened locks).

**Evaluation of the fixing hold:**

The hold of the hair is evaluated by successive passes of cold flat tongs along the lock. As more and more passes are performed, the lock becomes less rigid since the polymer film breaks. The more the lock withstands the passes of the flat tongs, the greater the hold of the gel.

It is found that the gels formulated according to the invention allow a markedly greater fixing hold than in the case of the same styling gels without surfactants.

**Evaluation of the rinsing of the gels from the hair:**

The locks prepared beforehand according to the protocol above are then rinsed with water according to the following protocol:

1. Rinsing with water, the temperature of the water being 38°C and the flow rate being 4 l/min, followed by passing the fingers through 15 times under water.
2. Wringing out the locks by 2 passes between the fingers.
3. Drying in the open air.

The locks are then classed according to their degree of cleanliness (removal of the product, smooth feel with no residues) in comparison with an untreated lock and relative to the same gel without surfactant.

It is found each time that the locks treated with a hairstyling gel according to the invention are cleaner after rinsing with water than in the case of the same gel without surfactant.

**Evaluation of the rinsing of the gels from the hands:**
1 gram of gel is applied to the hands. The product is spread between both hands. The hands are then passed under water (water temperature 38°C, flow rate 4 l/min) and the rinsing time is measured.

It is found each time that the hands are rinsed much more quickly with a styling gel according to the invention. They are cleaner after rinsing with water than in the case of the same gel without surfactant.
CLAIMS

1. Cosmetic composition, in particular cosmetic hair composition, comprising at least one anionic or non-ionic associative polymer, at least one anionic or non-ionic fixing polymer and at least one anionic, cationic or amphoteric surfactant.

2. - Cosmetic composition according to Claim 1, in which the associative polymer(s) is (are) chosen from the following anionic polymers:
   - polymers comprising at least one hydrophilic unit, and at least one fatty-chain allyl ether unit,
   - polymers comprising at least one hydrophilic unit of unsaturated olefinic carboxylic acid type and at least one hydrophobic unit of the type (C₁₀-C₃₀) alkyl ester of an unsaturated carboxylic acid,
   - polymers in which the hydrophilic unit of unsaturated olefinic carboxylic acid type corresponds to the monomer having the following formula (II):
     \[
     \begin{align*}
     &\text{CH}_2 \quad \text{c} \quad \text{OH} \\
     &\text{R}_1 \\
     \end{align*}
     \]
     in which \(R_1\) denotes \(H\) or \(\text{CH}_3\) or \(\text{C}_2\text{H}_5\), i.e. acrylic acid, methacrylic acid or ethacrylic acid units, and of which the hydrophobic unit of the type (C₁₀-C₃₀) alkyl ester of an unsaturated carboxylic acid corresponds to the monomer having the following formula (III):
     \[
     \begin{align*}
     &\text{CH}_2 \quad \text{C} \quad \text{C} \quad \text{OR}_3 \\
     &\text{R}_2 \\
     \end{align*}
     \]
     in which \(R_2\) denotes \(H\) or \(\text{CH}_3\) or \(\text{C}_2\text{H}_5\) (i.e. acrylate, methacrylate or ethacrylate units) and preferably \(H\) (acrylate units) or \(\text{CH}_3\) (methacrylate units), \(R_3\) denoting a C₁₀-C₃₀ and preferably C₁₂-C₂₂ alkyl radical,
   - maleic anhydride/C₃₀-C₃₈ \(\text{o}_\text{t}-\text{olefin/alkyl maleter terpolymers};
   - acrylic terpolymers comprising: (a) 20% to 70% by weight of an \(\alpha,\beta\)-monoethylenically unsaturated carboxylic acid, (b) 20% to 80% by weight of a non-surfactant \(\alpha,\beta\)-monoethylenically unsaturated monomer different from (a), (c) 0.5% to 60% by weight of a non-ionic monourethane which is the reaction product of a monohydric surfactant with a monoethylenically unsaturated monoisocyanate,
   - copolymers comprising among their monomers an \(\alpha,\beta\)-monoethylenically unsaturated carboxylic acid and an ester of an \(\alpha,\beta\)-monoethylenically unsaturated carboxylic acid and of an oxyalkylated fatty alcohol.

3. - Cosmetic composition according to Claim 1 or 2, in which the associative polymer(s) is (are) chosen from the copolymers comprising among their monomers an \(\alpha,\beta\)-monoethylenically unsaturated carboxylic acid and an ester
of an α,β-monoethylenically unsaturated carboxylic acid and of an oxyalkylenated fatty alcohol.

4. - Cosmetic composition according to Claim 1, in which the associative polymer(s) is (are) chosen from the following non-ionic polymers:
   (1) celluloses modified with groups comprising at least one fatty chain;
   (2) hydroxypropyl guars modified with groups comprising at least one fatty chain;
   (3) inulins modified with groups comprising at least one fatty chain;
   (4) copolymers of vinylpyrrolidone and of fatty-chain hydrophobic monomers, especially vinylpyrrolidone/hexadecene copolymers;
   (5) copolymers of C1-C8 alkyl methacrylates or acrylates and of amphiphilic monomers comprising at least one fatty chain;
   (6) copolymers of hydrophilic methacrylates or acrylates and of hydrophobic monomers comprising at least one fatty chain, in particular the polyethylene glycol methacrylate/lauryl methacrylate copolymer;
   (7) polyurethane polyethers comprising in their chain both hydrophilic blocks of polyoxyethylenated nature and hydrophobic blocks;
   (8) polymers with an aminoplast ether backbone containing at least one fatty chain.

5. - Composition according to Claim 1 or 4, in which the associative polymer(s) is (are) chosen from polyurethane polyethers comprising in their chain both hydrophilic blocks of polyoxyethylenated nature and hydrophobic blocks.

6. - Composition according to any one of the preceding claims, in which the associative polymer(s) of the composition is (are) present in a concentration ranging from 0.01% to 30% by weight, preferably in a concentration ranging from 0.1% to 20% by weight and even more preferentially ranging from 0.5% to 10% by weight of the total weight of the composition.

7. - Composition according to any one of the preceding claims, in which the fixing polymer(s) is (are) anionic, and preferably chosen from:
   - copolymers of acrylic or methacrylic acid;
   - copolymers of crotonic acid;
   - copolymers of C4-Cs monounsaturated carboxylic acids or anhydrides;
   - polyacrylamides comprising carboxylate groups;
   - homopolymers and copolymers comprising sulfonic groups such as polymers comprising vinylsulfonic, styrenesulfonic, naphthalenesulfonic or acrylamidoalkysulfonic units.

8. - Composition according to any one of the preceding claims, in which the fixing polymer(s) is (are) non-ionic, and preferably chosen from:
   - polyalkyloxazolines;
- vinyl acetate homopolymers;
- vinyl acetate copolymers;
- homopolymers and copolymers of acrylic esters;
- copolymers of acrylonitrile and of a non-ionic monomer;
- styrene homopolymers;
- styrene copolymers;
- polyamides;
- vinyllactam homopolymers;
- vinyllactam copolymers;
- non-hydrolysed polyvinylformamide polymers.

9. - Cosmetic composition according to any one of the preceding claims, in which the anionic or non-ionic fixing polymer(s) is (are) present in a concentration ranging from 0.1% to 40% by weight, preferentially ranging from 0.5% to 25% by weight and even more preferentially ranging from 1% to 10% by weight of the total weight of the composition.

10. Composition according to any one of the preceding claims, in which the surfactant(s) is (are) chosen from alkyl sulfates, alkyl ether sulfates, alkylamido ether sulfates, alkylaryloyl polyether sulfates, monoglyceride sulfates, alkyl sulfonates, alkylamide sulfonates, alkylaryl sulfonates, alpha-olefin sulfonates, paraffin sulfonates, alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl sulfoacetates, acyl sarcosinates, acyl glutamates, alkyl sulfosuccinamates, acyl isethionates and N-acyl taurates; salts of alkyl monoesters of polyglycoside-polycarboxylic acids, acyl lactylates, D-galactosiduronic acid salts, alkyl ether carboxylic acid salts, alkylaryl ether carboxylic acid salts, alkylamido ether carboxylic acid salts; and the corresponding non-salified forms of all these compounds; the alkyl and aryl groups of all these compounds comprising from 6 to 24 carbon atoms and the aryl group denoting a phenyl group, and even more preferentially from \((C_6-C_{20})\)alkyl sulfates, \((C_6-C_{24})\)alkyl ether sulfates comprising from 2 to 50 ethylene oxide units, in particular in the form of alkali metal, ammonium, aminoalcohol and alkaline-earth metal salts, or a mixture of these compounds.

11. - Composition according to any one of Claims 1 to 9, in which the surfactant(s) is (are) amphoteric surfactants preferably chosen from \((C_{5-C_{20}})\)alkylbetaines and \((C_8-C_{20})\)alkylamido\((C_{3-C_{8}})\)alkylbetaines.

12. - Composition according to any one of Claims 1 to 9, in which the surfactant(s) is (are) cationic surfactants preferably chosen from cetyltrimethylammonium, behenyltrimethylammonium and dipalmitoylethylhydroxyethylmethylammonium salts, and mixtures thereof, and
more particularly behenyltrimethylammonium chloride, cetyltrimethylammonium chloride, dipalmitoylethylhydroxyethylammonium methosulfate, and mixtures thereof.

13. - Composition according to any one of the preceding claims, in which the anionic, cationic or amphoteric surfactant(s) comprise(s) predominantly fatty chains having from 8 to 14 carbon atoms.

14. - Composition according to any one of the preceding claims, in which the anionic, cationic or amphoteric surfactant(s) is (are) present in a concentration ranging from 0.1 % to 40%, preferentially from 2% to 25% and even more preferentially ranging from 4% to 10% by weight relative to the total weight of the composition.

15. - Process for the cosmetic treatment of keratin fibres such as the hair, which consists in applying thereto a composition as defined in any one of the preceding claims.

16. - Use of the composition as defined in any one of Claims 1 to 14, for treating keratin fibres and in particular for retaining the form of and/or fixing the hair.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. A61K8/81 A61Q5/06 A61K8/04 A61K8/46 A61K8/44

**ADD.**

According to International Patent Classification (IPC) and/or both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)
A61K A61Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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Further documents are listed in the continuation of Box C.

See patent family annex.

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**Date of the actual completion of the international search**
21 February 2013

**Date of mailing of the international search report**
01/03/2013

Name and mailing address of the ISA/
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV RIJSWIJK
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Authorized officer
Yon, Jean-Michel
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