

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
21 July 2016 (21.07.2016)

(10) International Publication Number
WO 2016/113376 A1

- (51) International Patent Classification:
C11D 1/62 (2006.01) *C11D 3/22* (2006.01)
- (21) International Application Number:
PCT/EP2016/050721
- (22) International Filing Date:
15 January 2016 (15.01.2016)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
15151546.7 16 January 2015 (16.01.2015) EP
- (71) Applicant: RHODIA OPERATIONS [FR/FR]; 25 rue de Clichy, F-75009 Paris (FR).
- (72) Inventors: ZHANG, Hai Zhou; Regent park, B1 09-10, 22-26 Jalan Lempeng, Singapore 128803 (SG). CHRISTOV, Nikolay; 5 Normanton Park, #23-105, Singapore 119002 (SG). JIN, Da Wei; 337B Tah Ching Road, 13-53, Singapore 612337 (SG). HE, Lin; 8 Woodleigh Close # 12-20, 357903 Singapore (SG).
- (74) Agent: VANDE GUCHT, Anne; Rue de Ransbeek, 310, 1120 Bruxelles (BE).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report (Art. 21(3))



WO 2016/113376 A1

(54) Title: METHOD FOR REDUCING GREYING OF A FABRIC

(57) Abstract: The present invention relates to a method for reducing greying of a fabric when using a composition comprising a quaternary ammonium compound, for example, a fabric conditioning composition comprising a quaternary ammonium compound. The invention involves the use of a nonionic polysaccharide and reducing the amount of quaternary ammonium compound used.

Description**Method for reducing greying of a fabric**

[0001] This application claims priority to European application No. 15151546.7 filed on 16 Jan 2015, the whole content of this application being incorporated herein by reference for all purposes.

Technical Field

[0002] The present invention relates to a method for reducing greying of a fabric when using a composition comprising a quaternary ammonium compound, for example, a fabric conditioning composition comprising a quaternary ammonium compound.

Background Art

[0003] Fabric conditioning compositions can be added in the rinse cycle of the laundering process to soften fabrics and to impart them nice smell. Conventionally, fabric conditioning systems are based on quaternary ammonium compounds, also named as quats, notably cetrimonium chloride, behentrimonium chloride, N,N-bis(stearoyl-oxy-ethyl) N,N-dimethyl ammonium chloride, N,N-bis(tallowoyl-oxy-ethyl) N,N-dimethyl ammonium chloride, N,N-bis(stearoyl-oxy-ethyl) N-(2-hydroxyethyl) N-methyl ammonium methylsulfate or 1,2-di(stearoyl-oxy)-3-trimethyl ammoniumpropane chloride. However, quats are known difficult to be bio-degraded and thus exhibit eco toxicity. There is a general trend in the industry to switch to other conditioning systems, such as ester quats which provide better biodegradability and lower eco toxicity. Nevertheless, one problem with most quats, notably ester quats, which are of cationic nature, is that their presence (typically at content of at least 10 wt%) generally provokes an unpleasant greying appearance, especially on synthetic fabrics, such as, polyesters.

[0004] One aim of the invention is to provide a method for reducing greying of fabrics, notably in order to meet the visual satisfaction of customers, when using a composition including quats, such as ester quats, especially a fabric conditioning composition used during rinse cycle of the laundering process.

Summary of Invention

- [0005] It has now been found that the above objective is met by reducing the content of quats, such as ester quats, and adding at least a nonionic polysaccharide in the composition.
- [0006] More specifically, according to the present invention, there is provided a method for reducing greying of a fabric by using a composition comprising: (a) from 0.2 to 9 wt% of a quaternary ammonium compound; and (b) from 0.05 to 10 wt% of a nonionic polysaccharide, based on the total weight of the composition.
- [0007] Notably, the composition is a fabric conditioning composition.
- [0008] Preferably, the nonionic polysaccharide is a nonionic guar or a nonionic cellulose. In particular, the nonionic polysaccharide is a nonionic guar.
- [0009] Preferably, the quaternary ammonium compound is not a silicone containing quaternary ammonium compound.
- [0010] The quaternary ammonium compound may have the general formula (I) :

$$[N^+(R_1)(R_2)(R_3)(R_4)]_yX^- \text{ (I)}$$
 wherein:
 R₁, R₂, R₃ and R₄, which may be the same or different, is a C₁-C₃₀ hydrocarbon group, optionally containing a heteroatom or an ester or amide group;
 X is an anion;
 y is the valence of X.
- [0011] In some aspects, the quaternary ammonium compound has the general formula (II) :

$$[N^+(R_5)_2(R_6)(R_7)]_yX^- \text{ (II)}$$
 wherein :
 R₅ is an aliphatic C₁₋₃₀ group;
 R₆ is a C₁-C₄ alkyl group;
 R₇ is R₅ or R₆;
 X is an anion;
 y is the valence of X.
- [0012] In some aspects, the quaternary ammonium compound is a compound of general formula (III) :

$$[N^+((CH_2)_n-T-R_8)_m(R_9)_{4-m}]_yX^- \text{ (III)}$$

wherein :

R₈ group is independently selected from C₁-C₃₀ alkyl or alkenyl group;

R₉ group is independently selected from C₁-C₄ alkyl or hydroxylalkyl group;

T is -C(O)-O- or -O-C(=O)-;

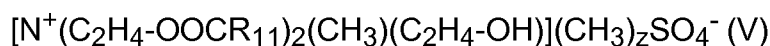
n is an integer from 0 to 5;

m is selected from 1, 2 and 3;

X is an anion, for example a chloride, bromide, nitrate or methosulphate ion;

y is the valence of X.

[0013] In particular, the quaternary ammonium compound has the general formula (V) :



wherein R₁₀ is a C₁₂-C₂₀ alkyl group;

z is an integer from 1 to 3.

[0014] The quaternary ammonium compound may be chosen from the group consisting of :

TET : Di(tallowcarboxyethyl)hydroxyethyl methyl ammonium methylsulfate;

TEO : Di(oleocarboxyethyl)hydroxyethyl methyl ammonium methylsulfate;

TES : Distearyl hydroxyethyl methyl ammonium methylsulfate;

TEHT : Di(hydrogenated tallow-carboxyethyl)hydroxyethyl methyl ammonium methylsulfate;

TEP : Di(palmiticcarboxyethyl)hydroxyethyl methyl ammonium methylsulfate;

DEEDMAC : Dimethylbis[2-[(1-oxooctadecyl)oxy]ethyl]ammonium chloride;

and

DHT : Dihydrogenated tallowdimethylammonium chloride.

[0015] In the composition used according to the invention, the amount of the quaternary ammonium compound is reduced compared to conventional compositions. In a preferred embodiment, the composition comprises 1 to 8 wt%, more preferably 3 to 5 wt% of the quaternary ammonium compound based on the total weight of the composition.

[0016] In some aspects, the composition further comprises (c) a cationic

polysaccharide. In that case, the cationic polysaccharide is preferably at a content of less than 1 wt% based on the total weight of the composition. It has been found that with this specific embodiment, the method of the present invention allows excellent softening performance, in addition to reduction of the greying of the fabrics. In other words, according to this embodiment, the composition exhibits the advantageous properties of the conditioning composition known from the prior art (that contains more than 10% wt of ester quats) but without their side effects. In addition, the composition used according to this embodiment allows improved perfume longevity.

[0017] Preferably, the method of the invention is provided for avoiding greying on synthetic fabric. The term "synthetic fabric" is understood to mean fabric which basically contains synthetics, for purpose of illustration, such as polyester, a mixture of polyester/cotton, polyamide, etc. The method of the invention has been found especially efficient with synthetic fabrics, in particular, in the condition of the specific embodiment described in the previous paragraph.

[0018] In some aspects, the cationic polysaccharide is a cationic guar.

[0019] Preferably, the cationic polysaccharide has an average molecular weight (Mw) of between 100,000 Daltons and 1,500,000 Daltons.

[0020] In some aspects, the composition further comprises a fragrance material or perfume.

[0021] Other advantages and more specific properties of the composition according to the present invention will be clear after reading the following description of the invention.

Detailed Description

[0022] In one aspect of the present invention, there is provided a method for reducing greying of a fabric by using a composition comprising: (a) from 0.2 to 9 wt% of a quaternary ammonium compound; (b) from 0.05 to 10 wt% of a nonionic polysaccharide, and optionally (c) less than 1 wt% of a cationic polysaccharide, based on the total weight of the composition. The composition of the present invention may be a personal care composition or a home care composition, notably a fabric conditioning composition.

- [0023] According to a more specific aspect, the present invention provides a method for reducing greying of a fabric (typically a synthetic fabric) by using a fabric conditioning composition comprising: (a) from 0.2 to 9 wt% of a quaternary ammonium compound; (b) from 0.05 to 10 wt% of a nonionic polysaccharide, and (c) preferably from 0.05 to 1 wt% of a cationic polysaccharide, more preferably from 0.1 to 0.4 wt% of a cationic polysaccharide, based on the total weight of the composition.
- [0024] Throughout the description, including the claims, the term "comprising one" or "comprising a" should be understood as being synonymous with the term "comprising at least one", unless otherwise specified, and "between" should be understood as being inclusive of the limits.
- [0025] In the context of this invention, the term "fabric conditioning" is used herein the broadest sense to include any conditioning benefit(s) to textile fabrics, materials, yarns, and woven fabrics. One such conditioning benefit is softening fabrics. Other non-limiting conditioning benefits include fabric lubrication, fabric relaxation, durable press, wrinkle resistance, wrinkle reduction, ease of ironing, abrasion resistance, fabric smoothing, anti-felting, anti-pilling, crispness, appearance enhancement, appearance rejuvenation, color protection, color rejuvenation, anti-shrinkage, in-wear shape retention, fabric elasticity, fabric tensile strength, fabric tear strength, static reduction, water absorbency or repellency, stain repellency; refreshing, anti-microbial, odor resistance; perfume freshness, perfume longevity, and mixtures thereof.
- [0026] As used herein, "greying of a fabric" means building up of coloration (typically yellow or grey colour) on a fabric during a process of treating the fabric. The process may be washing, conditioning (such as softening), drying, coloring, deodorizing, cleaning and the like. Said process may be a manual process or a process by using an automated machine.
- [0027] "Alkyl" as used herein means a straight chain or branched saturated aliphatic hydrocarbon group. "Alkenyl", as used herein, refers to an aliphatic group containing at least one double bond and is intended to include both "unsubstituted alkenyls" and "substituted alkenyls", the latter of which refers to alkenyl moieties having substituents replacing a

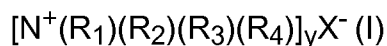
hydrogen on one or more carbon atoms of the alkenyl group.

- [0028] The term "cationic polymer" as used herein means any polymer which has a cationic charge.
- [0029] The term "quaternary ammonium compound" as used herein means a compound containing at least one quaternized nitrogen wherein the nitrogen atom is attached to four organic groups. The quaternary ammonium compound may comprise one or more quaternized nitrogen atoms.
- [0030] The term "cationic polysaccharide" as used herein means a polysaccharide or a derivative thereof that has been chemically modified to provide the polysaccharide or the derivative thereof with a net positive charge in a pH neutral aqueous medium. The cationic polysaccharide may also include those that are non permanently charged, e.g. a derivative that can be cationic below a given pH and neutral above that pH. Non-modified polysaccharides, such as starch, cellulose, pectin, carageenan, guar, xanthans, dextrans, curdlans, chitosan, chitin, and the like, can be chemically modified to impart cationic charges thereon. A common chemical modification incorporates quaternary ammonium substituents to the polysaccharide backbones. Other suitable cationic substituents include primary, secondary or tertiary amino groups or quaternary sulfonium or phosphonium groups. Additional chemical modifications may include cross-linking, stabilization reactions (such as alkylation and esterification), phosphorylations, hydrolyzations.
- [0031] The term "nonionic polysaccharide" as used herein refers to a polysaccharide or a derivative thereof that has been chemically modified to provide the polysaccharide or the derivative thereof with a net neutral charge in a pH neutral aqueous medium; or a non-modified polysaccharide.
- [0032] **Quaternary ammonium compound**
- [0033] In one aspect, the composition of the present invention comprises at least one quaternary ammonium compound. By way of exemplification, the quaternary ammonium compounds may be alkylated quaternary ammonium compounds, ring or cyclic quaternary ammonium compounds,

aromatic quaternary ammonium compounds, di-quaternary ammonium compounds, alkoxyated quaternary ammonium compounds, amidoamine quaternary ammonium compounds, ester quaternary ammonium compounds, and mixtures thereof. Typically, the quaternary ammonium compound used according to the present invention is an ester quaternary ammonium compound. Preferably, the quaternary ammonium compound is water dispersible.

[0034] Preferably, the quaternary ammonium compound is not a silicone containing quaternary ammonium compound, that is to say, the quaternary ammonium compound does not contain any siloxane bonds (-Si-O-Si-) or silicon-carbon bonds.

[0035] According to one aspect of the present invention, the quaternary ammonium compound is a compound of the general formula (I) :



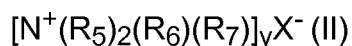
wherein :

R_1 , R_2 , R_3 and R_4 , which may be the same or different, is a C_1 - C_{30} hydrocarbon group, typically an alkyl, hydroxyalkyl or ethoxylated alkyl group, optionally containing a heteroatom or an ester or amide group;
X is an anion, for example halide, such as Cl or Br, sulphate, alkyl sulphate, nitrate or acetate;

y is the valence of X.

[0036] In some aspects, the quaternary ammonium compound is an alkyl quat, such as a dialkyl quat, or an ester quat such as a dialkyl diester quat.

[0037] The dialkyl quat may be a compound of general formula (II) :



wherein :

R_5 is an aliphatic C_{16-22} group;

R_6 is a C_1 - C_3 alkyl group;

R_7 is R_5 or R_6 ;

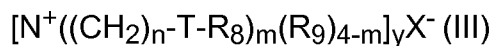
X is an anion, for example halide, such as Cl or Br, sulphate, alkyl sulphate, nitrate or acetate;

y is the valence of X.

[0038] The dialkyl quat is preferably di-(hardened tallow) dimethyl ammonium

chloride.

[0039] In some aspects, the quaternary ammonium compound is a compound of general formula (III) :



wherein :

R₈ group is independently selected from C₁-C₃₀ alkyl or alkenyl group;

R₉ group is independently selected from C₁-C₄ alkyl or hydroxyalkyl group;

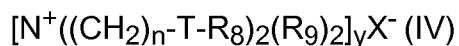
T is -C(O)-O- or -O-C(=O)-, n is an integer from 0 to 5;

m is selected from 1, 2 and 3;

X is an anion, for example a chloride, bromide, nitrate or methosulphate ion;

y is the valence of X.

[0040] Preferably, m as defined in general formula (III) is 2. Accordingly, the quaternary ammonium compound has the general formula of (IV) :



wherein R₈, R₉, T, n, y and X are as defined in general formula (III).

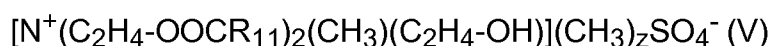
[0041] It is appreciated that in the general formula of (III) and (IV), T may also be -NR₁₀-C(=O)- or -(C=O)-NR₁₀, wherein R₁₀ is hydrogen, a C₁-C₆ alkyl or a C₁-C₆ hydroxyalkyl group.

[0042] In some aspects, the quaternary ammonium compound comprises two C₁₂-28 alkyl or alkenyl groups connected to the nitrogen head group, more preferably via at least one ester link. The quaternary ammonium compound preferably have two ester links present.

[0043] Preferably, the average chain length of the alkyl or alkenyl group is at least C₁₄, more preferably at least C₁₆. Even more preferably at least half of the chains have a length of C₁₈.

[0044] In some aspects, the alkyl or alkenyl chains are predominantly linear, although a degree of branching, especially mid-chain branching, is within the scope of the invention.

[0045] In some aspects, the ester quaternary ammonium compound is triethanolamine-based quaternary ammonium of general formula (V) :



wherein R_{11} is a C_{12} - C_{20} alkyl group;

z is an integer from 1 to 3.

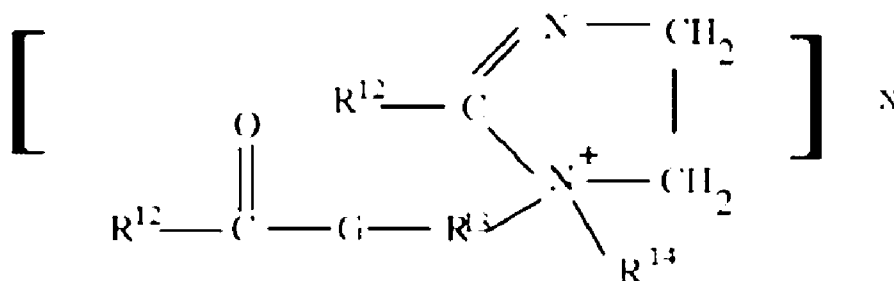
- [0046] The quaternary ammonium compound of the present invention may also be a mixture of various quaternary ammonium compounds, notably for instance a mixture of mono-, di- and tri-ester components or a mixture of mono-, and di- ester components, wherein for instance the amount of diester quaternary is comprised between 30 and 99% by weight based on the total amount of the quaternary ammonium compound.
- [0047] Preferably, the quaternary ammonium compound is a mixture of mono-, di- and tri-ester components, wherein:
- the amount of diester quaternary is comprised between 30 and 70% by weight based on the total amount of the quaternary ammonium compound, preferably between 40 and 60% by weight,
 - the amount of monoester quaternary is comprised between 10 and 60% by weight based on the total amount of the quaternary ammonium compound, preferably between 20 and 50% by weight,
 - the amount of triester quaternary is comprised between 1 and 20% by weight based on the total amount of the quaternary ammonium compound.
- [0048] Alternatively, the quaternary ammonium compound is a mixture of mono- and di- ester components, wherein:
- the amount of diester quaternary is comprised between 30 and 99 % by weight based on the total amount of the quaternary ammonium compound, preferably between 50 and 99 by weight,
 - the amount of monoester quaternary is comprised between 1 and 50 % by weight based on the total amount of the quaternary ammonium compound, preferably between 1 and 20% by weight.
- [0049] Preferred ester quaternary ammonium compounds of the present invention include :
- TET : Di(tallowcarboxyethyl)hydroxyethyl methyl ammonium methylsulfate,
 - TEO : Di(oleocarboxyethyl)hydroxyethyl methyl ammonium methylsulfate,
 - TES : Distearyl hydroxyethyl methyl ammonium methylsulfate,

TEHT : Di(hydrogenated tallow-carboxyethyl)hydroxyethyl methyl ammonium methylsulfate,

TEP : Di(palmiticcarboxyethyl)hydroxyethyl methyl ammonium methylsulfate,

DEEDMAC : Dimethylbis[2-[(1-oxooctadecyl)oxy]ethyl]ammonium chloride.

[0050] In one embodiment, the quaternary ammonium compound is a compound of the general formula

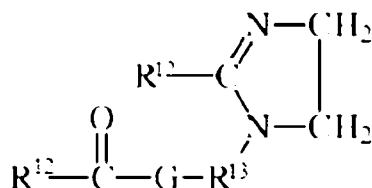


(VI)

wherein each R^{14} substituent is either hydrogen, a short chain C1-C6, preferably C1-C3 alkyl or hydroxyalkyl group, e.g. methyl, ethyl, propyl, hydroxyethyl, and the like, poly(C2-3 alkyl), preferably polyethoxy, benzyl, or mixtures thereof; R^{12} is a hydrocarbyl, or substituted hydrocarbyl group, and X^- have the definitions given above; R^{13} is a C1-6 alkylene group, preferably an ethylene group; and G is an oxygen atom or an -NR- group.

[0051] A non-limiting example of compound (VI) is 1-methyl-1-stearoylamidoethyl-2-stearoylimidazolium methylsulfate.

[0052] In one embodiment, the quaternary ammonium compound is a compound of the general formula

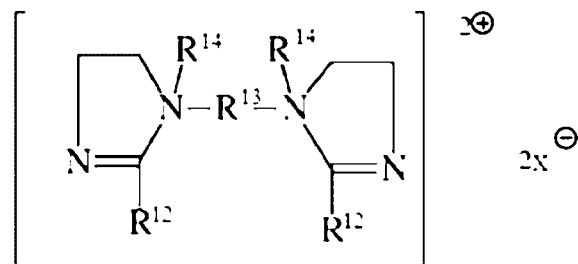


(VII)

[0053] A non-limiting example of compound (VII) is

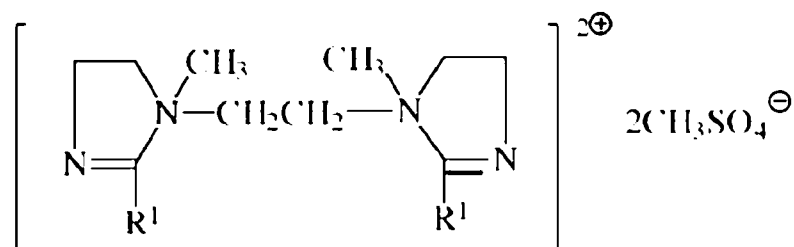
l-tallowylamidoethyl-2-tallowylimidazoline.

[0054] In one embodiment, the quaternary ammonium compound is a compound of the general formula



wherein R¹², R¹³ and R¹⁴ are defined as above.

[0055] A non-limiting example of compound (VIII) is



wherein R¹ is derived from fatty acid.

[0056] The quaternary ammonium compound of the present invention may be present in an amount of from 0.2 to 9 wt % based on the total weight of the composition. More preferably, the quaternary ammonium compound of the present invention is present in an amount of from 1 to 8 wt % based on the total weight of the composition. Even more preferably, the quaternary ammonium compound of the present invention is present in an amount of from 3 to 5 wt % based on the total weight of the composition.

[0057] **Nonionic polysaccharide**

[0058] In one aspect, the composition of the present invention comprises at least one nonionic polysaccharide. Preferably, the composition comprises only one nonionic polysaccharide.

[0059] The nonionic polysaccharide can be a modified nonionic polysaccharide or a non-modified nonionic polysaccharide. The modified nonionic polysaccharide may comprise hydroxyalkylation and/or esterification. In the context of the present application, the level of modification of nonionic polysaccharides may be characterized by Molar Substitution (MS), which

means the average number of moles of substituents, such as hydroxypropyl groups, per mole of the monosaccharide unit. MS notably means the number of alkylene oxide molecules consumed by the number of free hydroxyl functions present on the polysaccharides. MS can be determined by the Zeisel-GC method, notably based on the following literature reference: K. L. Hodges, W. E. Kester, D. L. Wiederrich, and J. A. Grover, "Determination of Alkoxy Substitution in Cellulose Ethers by Zeisel-Gas Chromatography", *Analytical Chemistry*, Vol. 51, No. 13, November 1979.

- [0060] Preferably, the MS of the modified nonionic polysaccharide is in the range of 0 to 3. More preferably, the MS of the modified nonionic polysaccharide is in the range of 0.1 to 3. Even more preferably, the MS of the modified nonionic polysaccharide is in the range of 0.1 to 2.
- [0061] The nonionic polysaccharide of the present invention may be especially chosen from glucans, modified or non-modified starches (such as those derived, for example, from cereals, for instance wheat, corn or rice, from vegetables, for instance yellow pea, and tubers, for instance potato or cassava), amylose, amylopectin, glycogen, dextrans, celluloses and derivatives thereof (methylcelluloses, hydroxyalkylcelluloses, ethylhydroxyethylcelluloses), mannans, xylans, lignins, arabans, galactans, galacturonans, chitin, chitosans, glucuronoxylans, arabinoxylans, xyloglucans, glucomannans, pectic acids and pectins, arabinogalactans, carrageenans, agars, gum arabics, gum tragacanth, ghatti gums, karaya gums, carob gums, galactomannans such as guar and nonionic derivatives thereof (hydroxypropyl guar), and mixtures thereof.
- [0062] Notably, the nonionic polysaccharide is a nonionic cellulose or nonionic guar, in particular a nonionic guar.
- [0063] Among the celluloses that are especially used are hydroxyethylcelluloses and hydroxypropylcelluloses. Mention may be made of the products sold under the names Klucel[®] EF, Klucel[®] H, Klucel[®] LHF, Klucel[®] MF and Klucel[®] G by the company Aqualon, and Cellosize[®] Polymer PCG-10 by the company Amerchol, and HEC, HPMC K200, HPMC K35M by the

company Ashland.

- [0064] The nonionic guar can be modified or non-modified. The non-modified nonionic guar include the products sold under the name Vidogum[®] GH 175 by the company Unipectine and under the names Meypro[®]-Guar 50 and Jaguar[®] C by the company Solvay. The modified nonionic guar are especially modified with C₁-C₆ hydroxyalkyl groups. Among the hydroxyalkyl groups that may be mentioned, for example, are hydroxymethyl, hydroxyethyl, hydroxypropyl and hydroxybutyl groups. These guar are well known in the prior art and can be prepared, for example, by reacting the corresponding alkene oxides such as, for example, propylene oxides, with the guar so as to obtain a guar modified with hydroxypropyl groups.
- [0065] The nonionic polysaccharide, such as the nonionic guar, of the present invention may have an average molecular weight (Mw) of between 100,000 Daltons and 3,500,000 Daltons, preferably between 500,000 Daltons and 3,500,000 Daltons.
- [0066] In some aspects, the composition comprises from 0.05 to 10 wt % of the nonionic polysaccharide according to the present invention based on the total weight of the composition. Preferably, the composition comprises from 0.05 to 5 wt % of the nonionic polysaccharide based on the total weight of the composition. More preferably, the composition comprises from 0.2 to 2 wt % of the nonionic polysaccharide based on the total weight of the composition.
- [0067] **Cationic polysaccharide**
- [0068] In one aspect, the composition of the present invention comprises at least one cationic polysaccharide. Preferably, the composition comprises only one cationic polysaccharide.
- [0069] The cationic polysaccharide can be obtained by chemically modifying polysaccharides, generally natural polysaccharides. By such modification, cationic side groups can be introduced into the polysaccharide backbone. In one embodiment, the cationic groups borne by the cationic polysaccharide according to the present invention are quaternary ammonium groups.

- [0070] The cationic polysaccharides of the present invention include but are not limited to :
- cationic guar and derivatives thereof, cationic cellulose and derivatives thereof, cationic starch and derivatives thereof, cationic callose and derivatives thereof, cationic xylan and derivatives thereof, cationic mannan and derivatives thereof, cationic galactomannose and derivative thereof.
- [0071] Cationic celluloses suitable for the present invention include cellulose ethers comprising quaternary ammonium groups, cationic cellulose copolymers or celluloses grafted with a water-soluble quaternary ammonium monomer.
- [0072] The cellulose ethers comprising quaternary ammonium groups are described in French patent 1,492,597 and in particular include the polymers sold under the names "JR" (JR 400, JR 125, JR 30M) or "LR" (LR 400, LR 30M) by the company Dow. These polymers are also defined in the CTFA dictionary as hydroxyethylcellulose quaternary ammoniums that have reacted with an epoxide substituted with a trimethylammonium group. Suitable cationic celluloses also include LR3000 KC from company Solvay.
- [0073] The cationic cellulose copolymers or the celluloses grafted with a water-soluble quaternary ammonium monomer are described especially in patent U.S. Pat. No. 4,131,576, such as hydroxyalkylcelluloses, for instance hydroxymethyl-, hydroxyethyl- or hydroxypropylcelluloses grafted especially with a methacryloyl-ethyltrimethylammonium, methacrylamidopropyltrimethylammonium or dimethyl-diallylammonium salt. The commercial products corresponding to this definition are more particularly the products sold under the names Celquat[®] L 200 and Celquat[®] H 100 by the company Akzo Nobel.
- [0074] Cationic starches suitable for the present invention include the products sold under Polygelo[®] (cationic starches from Sigma), the products sold under Softgel[®], Amylofax[®] and Solvitose[®] (cationic starches from Avebe). CATO from National Starch. Suitable cationic galactomannose include, for example, Fenugreek Gum, Konjac Gum, Tara Gum, Cassia Gum.
- [0075] In some aspects, the cationic polysaccharide is a cationic guar. Guars are

polysaccharides composed of the sugars galactose and mannose. The backbone is a linear chain of β 1,4-linked mannose residues to which galactose residues are 1,6-linked at every second mannose, forming short side-branches. Within the context of the present invention, the cationic guarans are cationic derivatives of guarans.

- [0076] In the case of the cationic polysaccharide, such as the cationic guar, the cationic group may be a quaternary ammonium group bearing 3 radicals, which may be identical or different, preferably chosen from hydrogen, alkyl, hydroxyalkyl, epoxyalkyl, alkenyl, or aryl, preferably containing 1 to 22 carbon atoms, more particularly 1 to 14 and advantageously 1 to 3 carbon atoms. The counterion is generally a halogen. One example of the halogen is chlorine.
- [0077] Examples of the quaternary ammonium group include :
3-chloro-2-hydroxypropyl trimethyl ammonium chloride (CHPTMAC),
2,3-epoxypropyl trimethyl ammonium chloride (EPTAC), diallyldimethyl ammonium chloride (DMAAC), vinylbenzene trimethyl ammonium chloride, trimethylammonium ethyl metacrylate chloride, methacrylamidopropyltrimethyl ammonium chloride (MAPTAC), and tetraalkylammonium chloride.
- [0078] One example of the cationic functional group in the cationic polysaccharides, such as the cationic guarans, is trimethylamino(2-hydroxy)propyl, with a counter ion. Various counter ions can be utilized, including but not limited to halides, such as chloride, fluoride, bromide, and iodide, sulfate, nitrate, methylsulfate, and mixtures thereof.
- [0079] The cationic guarans of the present invention may be chosen from the group consisting of :
cationic hydroxyalkyl guarans, such as cationic hydroxyethyl guar, cationic hydroxypropyl guar, cationic hydroxybutyl guar, and cationic carboxylalkyl guarans including cationic carboxymethyl guar, cationic alkylcarboxy guarans such as cationic carboxylpropyl guar and cationic carboxybutyl guar, cationic carboxymethylhydroxypropyl guar.
- [0080] In an exemplary embodiment, the cationic guarans of the present invention

are guar hydroxypropyltrimonium chloride or hydroxypropyl guar hydroxypropyltrimonium chloride.

- [0081] The cationic polysaccharide, such as the cationic guar, of the present invention may have an average molecular weight (Mw) of between 100,000 Daltons and 3,500,000 Daltons, preferably between 100,000 Daltons and 1,500,000 Daltons, more preferably between 100,000 Daltons and 1,000,000 Daltons.
- [0082] Preferably, the composition used according to the present invention comprises less than 1 % wt of the cationic polysaccharide based on the total weight of the composition. More preferably, the composition comprises from 0.05 to 1 wt % of the cationic polysaccharide based on the total weight of the composition. Even more preferably, the composition comprises from 0.1 to 0.4 wt % of the cationic polysaccharide based on the total weight of the composition.
- [0083] In the context of the present application, the term "Degree of Substitution (DS)" of cationic polysaccharides, such as cationic guar, is the average number of hydroxyl groups substituted per sugar unit. DS may notably represent the number of the carboxymethyl groups per sugar unit. DS may be determined by titration.
- [0084] The DS of the cationic polysaccharide, such as the cationic guar, may be in the range of 0.01 to 1. Preferably, the DS of the cationic polysaccharide, such as the cationic guar, is in the range of 0.05 to 1. More preferably, the DS of the cationic polysaccharide, such as the cationic guar, is in the range of 0.05 to 0.2.
- [0085] In the context of the present application, "Charge Density (CD)" of cationic polysaccharides, such as cationic guar, means the ratio of the number of positive charges on a monomeric unit of which a polymer is comprised to the molecular weight of said monomeric unit.
- [0086] The CD of the cationic polysaccharide, such as the cationic guar, is in the range of 0.1 to 3 (meq/gm). Preferably, the CD of the cationic polysaccharide, such as the cationic guar, is in the range of 0.1 to 2 (meq/gm). More preferably, the CD of the cationic polysaccharide, such as the cationic guar, is in the range of 0.1 to 1 (meq/gm).

- [0087] The ratio of the weight of the quaternary ammonium compound in the composition to the total weight of the nonionic polysaccharide, and optionally the cationic polysaccharide, in the composition may be between 100:1 and 2:1, more preferably, between 30:1 and 5:1.
- [0088] The ratio of the weight of the cationic polysaccharide in the composition and the weight of the nonionic polysaccharide in the composition may be between 1:10 and 10:1, more preferably, between 1:3 and 3:1.
- [0089] In another aspect of the present invention, the composition may further comprise a fragrance material or perfume.
- [0090] As used herein, the term "fragrance material or perfume" means any organic substance or composition which has a desired olfactory property and is essentially non-toxic. Such substances or compositions include all fragrance material and perfumes that are commonly used in perfumery or in household compositions (laundry detergents, fabric conditioning compositions, soaps, all-purpose cleaners, bathroom cleaners, floor cleaners) or personal care compositions. The compounds involved may be natural, semi-synthetic or synthetic in origin.
- [0091] Preferred fragrance materials and perfumes may be assigned to the classes of substance comprising the hydrocarbons, aldehydes or esters. The fragrances and the perfumes also include natural extracts and/or essences, which may comprise complex mixtures of constituents, i.e. fruits such as almond, apple, cherry, grape, pear, pineapple, orange, lemon, strawberry, raspberry and the like; musk, flower scents such as lavender, jasmine, lily, magnolia, rose, iris, carnation and the like; herbal scents such as rosemary, thyme, sage and the like; woodland scents such as pine, spruce, cedar and the like.
- [0092] Non limitative examples of synthetic and semi-synthetic fragrance materials and perfumes are :
- 7-acetyl-1,2,3,4,5,6,7,8-octahydro-1,1,6,7-tetramethylnaphthalene, α -ionone, β -ionone, γ -ionone, α -isomethylionone, methylcedrylone, methyl dihydrojasmonate, methyl 1,6,10-trimethyl-2,5,9-cyclododecatrien-1-yl ketone, 7-acetyl-1,1,3,4,4,6-hexamethyltetralin, 4-acetyl-6-tert-butyl-1,1-dimethylindane, hydroxyphenylbutanone,

benzophenone, methyl b-naphthyl ketone,
6-acetyl-1,1,2,3,3,5-hexamethylindane, 5-acetyl-3-isopropyl-1,1,2-,
6-tetramethylindane, 1-dodecanal,
4-(4-hydroxy-4-methylpentyl)-3-cyclohex-ene-1-carboxaldehyde,
7-hydroxy-3,7-dimethyloctanal, 10-undecen-1-al,
isohexenylcyclohexylcarboxaldehyde, formyltricyclodecane, condensation
products of hydroxycitronellal and methyl anthranilate, condensation
products of hydroxycitronellal and indole, condensation products of
phenylacetaldehyde and indole,
2-methyl-3-(para-tert-butylphenyl)propionaldehyde, ethylvanillin,
heliotropin, hexylcinnamaldehyde, amylcinnamaldehyde,
2-methyl-2-(isopropylphenyl)propionaldehyde, coumarin, γ -decalactone,
cyclopentadecanolide, 16-hydroxy-9-hexadecenoic acid lactone,
1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-g-benzopyran,
 β -naphthol methyl ether, ambroxane,
dodecahydro-3a,6,6,9a-tetramethylnaphtho[2,1b]furan, cedrol,
5-(2,2,3-trimethylcyclopent-3-enyl)-3-methylpentan-2-ol,
2-ethyl-4-(2,2,3-trimethyl-3-cyclopenten-1-yl)-2-buten-1-ol, caryophyllene
alcohol, tricyclodecenyl propionate, tricyclodecenyl acetate, benzyl
salicylate, cedryl acetate, and tert-butylcyclohexyl acetate.

[0093] Particular preference is given to the following :

hexylcinnamaldehyde, 2-methyl-3-(tert-butylphenyl)propionaldehyde,
7-acetyl-1,2,3,4,5,6,7,8-octahydro-1,1,6,7-tetramethylnaphthalene, benzyl
salicylate, 7-acetyl-1,1,3,4,4,6-hexamethyltetralin, para-tert-butylcyclohexyl
acetate, methyl dihydrojasmonate, (β -naphthol methyl ether, methyl
g-naphthyl ketone, 2-methyl-2-(para-isopropylphenyl)propionaldehyde,
1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-g-2-benzopyran,
dodecahydro-3a,6,6,9a-tetramethylnaphtho[2,1b]furan, anisaldehyde,
coumarin, cedrol, vanillin, cyclopentadecanolide, tricyclodecenyl acetate
and tricyclodecenyl propionates.

[0094] Other fragrance materials and perfumes are essential oils, resinoids and
resins from a large number of sources, such as, for example, Peru balsam,
olibanum resinoid, styrax, labdanum resin, nutmeg, cassia oil, benzoin

resin, coriander, and lavandin.

- [0095] Further suitable fragrance materials and perfumes include: phenylethyl alcohol, terpineol, linalool, linalyl acetate, geraniol, nerol, 2-(1,1-dimethylethyl)cyclo-hexanol acetate, benzyl acetate, and eugenol.
- [0096] The fragrance material or perfume can be used as single substance or in a mixture with one another.
- [0097] Some or all of the fragrance materials and perfumes may be encapsulated, typical perfume components which it is advantageous to encapsulate, include those with a relatively low boiling point. It is also advantageous to encapsulate perfume components which have a low Clog P (i.e. those which will be partitioned into water), preferably with a Clog P of less than 3.0. As used herein, the term "Clog P" means the calculated logarithm to base 10 of the octanol/water partition coefficient (P).
- [0098] Perfumes frequently include solvents or diluents, for example: ethanol, isopropanol, diethylene glycol monoethyl ether, dipropylene glycol, diethyl phthalate and triethyl citrate.
- [0099] In still another aspect of the present invention, the composition may comprise one or more of the following optional ingredients : dispersing agents, stabilizers, rheology modifying agent, pH control agents, colorants, brighteners, fatty alcohols, fatty acids, dyes, odor control agent, pro-perfumes, cyclodextrins, solvents, soil release polymers, preservatives, antimicrobial agents, chlorine scavengers, anti-shrinkage agents, fabric crisping agents, spotting agents, anti-oxidants, anti-corrosion agents, bodying agents, drape and form control agents, smoothness agents, static control agents, wrinkle control agents, sanitization agents, disinfecting agents, germ control agents, mold control agents, mildew control agents, antiviral agents, anti-microbials, drying agents, stain resistance agents, soil release agents, malodor control agents, fabric refreshing agents, chlorine bleach odor control agents, dye fixatives, dye transfer inhibitors, color maintenance agents, color restoration/rejuvenation agents, anti-fading agents, whiteness enhancers, anti-abrasion agents, wear resistance agents, fabric integrity agents, anti-wear agents, defoamers and anti-foaming agents, rinse aids, UV

protection agents, sun fade inhibitors, insect repellents, anti-allergenic agents, enzymes, flame retardants, water proofing agents, fabric comfort agents, water conditioning agents, shrinkage resistance agents, stretch resistance agents, and mixtures thereof. Such optional ingredients may be added to the composition in any desired order.

[0100] In referring to other optional components, without this having to be regarded as an exhaustive description of all possibilities, which, on the other hand, are well known to the person skilled in the art, the following may be mentioned :

- a) other products that enhance the softening performance of the composition, such as silicones, amine oxides, anionic surfactants, such as lauryl ether sulphate or lauryl sulphate, sulphosuccinates, amphoteric surfactants, such as amphoacetate, nonionic surfactants such as polysorbate, polyglucoside derivatives, and cationic polymers such as polyquaternium, etc.;
- b) stabilising products, such as salts of amines having a short chain, which are quaternised or non-quaternised, for example of triethanolamine, N-methyldiethanolamine, etc., and also non-ionic surfactants, such as ethoxylated fatty alcohols, ethoxylated fatty amines, polysorbate, and ethoxylated alkyl phenols; typically used at a level of from 0 to 15 % by weight of the composition;
- c) products that improve viscosity control, for example inorganic salts, such as calcium chloride, magnesium chloride, calcium sulphate, sodium chloride, etc.; products which can be used improve the stability in concentrated compositions, such as compounds of the glycol type, such as, glycerol, polyglycerols, ethylene glycol, polyethylene glycols, dipropylene glycol, other polyglycols, etc.; and thickening agents for diluted compositions, for example, natural polymers derived from cellulose, guar, etc. or synthetic polymers, such as acrylamide based polymers (e.g. Flosoft 222 from SNF company), hydrophobically-modified ethoxylated urethanes (e.g. Acusol 880 from Dow company);
- d) components for adjusting the pH, which is preferably from 2 to 6, such as any type of inorganic and/or organic acid, for example hydrochloric,

sulphuric, phosphoric, citric acid etc.;

e) agents that improve soil release, such as the known polymers or copolymers based on terephthalates;

f) bactericidal preservative agents;

g) other products such as antioxidants, colouring agents, perfumes, germicides, fungicides, anti-corrosive agents, anti-crease agents, opacifiers, optical brighteners, pearl lustre agents, etc..

- [0101] The composition may comprise a silicone compound. The silicone compound of the invention can be a linear or branched structured silicone polymer. The silicone of the present invention can be a single polymer or a mixture of polymers. Suitable silicone compounds include polyalkyl silicone, monosilicone, siloxane, polydimethyl siloxane, ethoxylated organosilicone, propoxylated organosilicone, ethoxylated/propoxylated organosilicone and mixture thereof. Suitable silicones include but are not limited to those available from Wacker Chemical, such as Wacker[®] FC 201 and Wacker[®] FC 205.
- [0102] The composition may comprise a cross-linking agent. Following is a non-restrictive list of cross-linking agents: methylene bisacrylamide (MBA), ethylene glycol diacrylate, polyethylene glycol dimethacrylate, diacrylamide, triallylamine, cyanomethylacrylate, vinyl oxyethylacrylate or methacrylate and formaldehyde, glyoxal, compounds of the glycidyl ether type such as ethyleneglycol diglycidyl ether, or the epoxydes or any other means familiar to the expert permitting cross-linking.
- [0103] The composition may comprise at least one surfactant system. A variety of surfactants can be used in the composition of the invention, including cationic, nonionic and/or amphoteric surfactants, which are commercially available from a number of sources. For a discussion of surfactants, see Kirk-Othmer, Encyclopedia of Chemical Technology, Third Edition, volume 8, pages 900-912. Preferably, the composition comprises a surfactant system in an amount effective to provide a desired level of softness to fabrics, preferably between about 5 and about 10 wt%.
- [0104] The composition may comprise a dye, such as an acid dye, a hydrophobic dye, a basic dye, a reactive dye, a dye conjugate. Suitable acid dyes

include azine dyes such as acid blue 98, acid violet 50, and acid blue 59, non-azine acid dyes such as acid violet 17, acid black 1 and acid blue 29. Hydrophobic dyes selected from benzodifuranes, methine, triphenylmethanes, naphthalimides, pyrazole, naphthoquinone, anthraquinone and mono-azo or di-azo dye chromophores. Suitable hydrophobic dyes are those dyes which do not contain any charged water solubilising group. The hydrophobic dyes may be selected from the groups of disperse and solvent dyes. Blue and violet anthraquinone and mono-azo dye are preferred. Basic dyes are organic dyes which carry a net positive charge. They deposit onto cotton. They are of particular utility for used in composition that contain predominantly cationic surfactants. Dyes may be selected from the basic violet and basic blue dyes listed in the Colour Index International. Preferred examples include triarylmethane basic dyes, methane basic dye, anthraquinone basic dyes, basic blue 16, basic blue 65, basic blue 66, basic blue 67, basic blue 71, basic blue 159, basic violet 19, basic violet 35, basic violet 38, basic violet 48; basic blue 3, basic blue 75, basic blue 95, basic blue 122, basic blue 124, basic blue 141. Reactive dyes are dyes which contain an organic group capable of reacting with cellulose and linking the dye to cellulose with a covalent bond. Preferably the reactive group is hydrolysed or reactive group of the dyes has been reacted with an organic species such as a polymer, so as to the link the dye to this species. Dyes may be selected from the reactive violet and reactive blue dyes listed in the Colour Index International. Preferred examples include reactive blue 19, reactive blue 163, reactive blue 182 and reactive blue, reactive blue 96. Dye conjugates are formed by binding direct, acid or basic dyes to polymers or particles via physical forces. Dependent on the choice of polymer or particle they deposit on cotton or synthetics. A description is given in WO2006/055787. Particularly preferred dyes are: direct violet 7, direct violet 9, direct violet 11, direct violet 26, direct violet 31, direct violet 35, direct violet 40, direct violet 41, direct violet 51, direct violet 99, acid blue 98, acid violet 50, acid blue 59, acid violet 17, acid black 1, acid blue 29, solvent violet 13, disperse violet 27 disperse violet 26, disperse violet 28, disperse violet 63, disperse violet

77 and mixtures thereof. The solid composition of the present invention may comprise one or more perfumes. The perfume is preferably present in an amount between 0.01 and 20 wt%, more preferably between 0.05 and 10 wt%, even more preferably between 0.05 and 5 wt%, most preferably between 0.05 and 1.5 wt%, based on the total weight of the solid composition.

- [0105] The composition may comprise an antimicrobial. The antimicrobial may be a halogenated material. Suitable halogenated materials include 5-chloro-2-(2,4-dichlorophenoxy)phenol, o-Benzyl-p-chloro-phenol, and 4-chloro-3-methylphenol. Alternatively The antimicrobial may be a non-halogenated material. Suitable non-halogenated materials include 2-Phenylphenol and 2-(1-Hydroxy-1-methylethyl)-5-methylcyclohexanol. Phenyl ethers are one preferred sub-set of the antimicrobials. The antimicrobial may also be a bi-halogenated compound. Most preferably this comprises 4-4' dichloro-2-hydroxy diphenyl ether, and /or 2,2-dibromo-3-nitrilopropionamide (DBNPA).
- [0106] The composition may also comprise preservatives. Preferably only those preservatives that have no, or only slight, skin sensitizing potential are used. Examples are phenoxy ethanol, 3-iodo-2-propynylbutyl carbamate, sodium N-(hydroxymethyl)glycinate, biphenyl-2-ol as well as mixtures thereof.
- [0107] The composition may also comprise antioxidants to prevent undesirable changes caused by oxygen and other oxidative processes to the solid composition and/or to the treated textile fabrics. This class of compounds includes, for example, substituted phenols, hydroquinones, pyrocatechols, aromatic amines and vitamin E.
- [0108] The composition may comprise a hydrophobic agent. The hydrophobic agent may be present in an amount of from 0.05 to 1.0 wt%, preferably from 0.1 to 0.8 wt%, more preferably from 0.2 to 0.7 and most preferably from 0.4 to 0.7 wt% by weight of the total composition, for example from 0.2 to 0.5 wt%. The hydrophobic agent may have a ClogP of from 4 to 9, preferably from 4 to 7, most preferably from 5 to 7.
- [0109] Suitable hydrophobic agents include esters derived from the reaction of a

fatty acid with an alcohol. The fatty acid preferably has a carbon chain length of from C₈ to C₂₂ and may be saturated or unsaturated, preferably saturated. Some examples include stearic acid, palmitic acid, lauric acid and myristic acid. The alcohol may be linear, branched or cyclic. Linear or branched alcohols have a preferred carbon chain length of from 1 to 6. Preferred alcohols include methanol, ethanol, propanol, isopropanol, sorbitol. Preferred hydrophobic agents include methyl esters, ethyl esters, propyl esters, isopropyl esters and sorbitan esters derived from such fatty acids and alcohols.

- [0110] Non-limiting examples of suitable hydrophobic agents include methyl esters derived from fatty acids having a carbon chain length of from at least C₁₀, ethyl esters derived from fatty acids having a carbon chain length of from at least C₁₀, propyl esters derived from fatty acids having a carbon chain length of from at least C₈, isopropyl esters derived from fatty acids having a carbon chain length of from at least C₈, sorbitan esters derived from fatty acids having a carbon chain length of from at least C₁₆, and alcohols with a carbon chain length greater than C₁₀. Naturally occurring fatty acids commonly have a carbon chain length of up to C₂₂.
- [0111] Some preferred materials include methyl undecanoate, ethyl decanoate, propyl octanoate, isopropyl myristate, sorbitan stearate and 2-methyl undecanol, ethyl myristate, methyl myristate, methyl laurate, isopropyl palmitate and ethyl stearate; more preferably methyl undecanoate, ethyl decanoate, isopropyl myristate, sorbitan stearate, 2-methyl undecanol, ethyl myristate, methyl myristate, methyl laurate and isopropyl palmitate.
- [0112] Non-limiting examples of such materials include methyl undecanoate, ethyl decanoate, propyl octanoate, isopropyl myristate, sorbitan stearate and 2-methyl undecanol; preferably methyl undecanoate, ethyl decanoate, isopropyl myristate, sorbitan stearate and 2-methyl undecanol.
- [0113] The composition may comprise an antifoam agent. The antifoam agent may be present in an amount of from 0.025 to 0.45 wt%, preferably 0.03 to 0.4 wt%, most preferably from 0.05 to 0.35 wt%, for example 0.07 to 0.4 wt%, by weight of the total composition and based on 100 percent antifoam activity. A wide variety of materials may be used as the antifoam

agent, and antifoam agents are well known to those skilled in the art. See, for example, Kirk Othmer Encyclopedia of Chemical Technology, Third Edition, Volume 7, pages 430-447 (John Wiley and Sons, Inc., 1979).

- [0114] Suitable antifoam agents include, for example, silicone antifoam compounds, alcohol antifoam compounds, for example 2-alkyl alcanol antifoam compounds, fatty acids, paraffin antifoam compounds, and mixtures thereof. By antifoam compound it is meant herein any compound or mixtures of compounds which act such as to depress the foaming or sudsing produced by a solution of a detergent composition, particularly in the presence of agitation of that solution.
- [0115] Particularly preferred antifoam agents for use herein are silicone antifoam compounds defined herein as any antifoam compound including a silicone component. Many such silicone antifoam compounds also contain a silica component. The term "silicone" as used herein, and in general throughout the industry, encompasses a variety of relatively high molecular weight polymers containing siloxane units and hydrocarbyl group of various types like the polyorganosiloxane oils, such as polydimethyl-siloxane, dispersions or emulsions of polyorganosiloxane oils or resins, and combinations of polyorganosiloxane with silica particles wherein the polyorganosiloxane is chemisorbed or fused onto the silica. Silica particles are often hydrophobed, e.g. as Trimethylsiloxysilicate. Silicone antifoam agents are well known in the art and are, for example, disclosed in U. S. Patent 4, 265, 779, issued May 5, 25 1981 and European Patent Application No. 89307851. 9, published February 7, 1990. Other silicone antifoam compounds are disclosed in U. S. Patent 3, 455, 839. Silicone defoamers and suds controlling agents in granular detergent compositions are disclosed in U. S. Patent 3, 933, 672, 35 and in U. S. Patent 4, 652, 392 issued March 24, 1987. Examples of suitable silicone antifoam compounds are the combinations of polyorganosiloxane with silica particles commercially available from Dow Corning, Wacker Chemie and Momentive.
- [0116] Other suitable antifoam compounds include the monocarboxylic fatty acids and soluble salts thereof. These materials are described in US Patent 2,

954, 347. The monocarboxylic fatty acids, and salts thereof, for use as antifoam agents typically have hydrocarbyl chains of about 10 to about 24 carbon atoms, preferably about 12 to about 18 carbon atoms like the tallow amphopolycarboxyglycinate commercially available under the trade name TAPAC. Suitable salts include the alkali metal salts such as sodium, potassium, and lithium salts, and ammonium and alkanolammonium salts.

[0117] Other suitable antifoam compounds include, for example, high molecular weight hydrocarbons such as paraffin, light petroleum odourless hydrocarbons, fatty esters (e. g. fatty acid triglycerides, glyceryl derivatives, polysorbates), fatty acid esters of monovalent alcohols, aliphatic C₁₈₋₄₀ ketones (e. g. stearone) N-alkylated amino triazines such as tri- to hexa- 10 alkylmelamines or di- to tetra alkyl diamine chlorotriazines formed as products of cyanuric chloride with two or three moles of a primary or secondary amine containing 1 to 24 carbon atoms, propylene oxide, bis stearic acid amide and monostearyl phosphates such as monostearyl alcohol phosphate ester and monostearyl di-alkali metal (e. g., K, Na, and Li) phosphates and phosphate esters, and nonionic polyhydroxyl derivatives. The hydrocarbons, such as paraffin and 15 haloparaffin, can be utilized in liquid form. The liquid hydrocarbons will be liquid at room temperature and atmospheric pressure, and will have a pour point in the range of about -40 °C and about 5 °C, and a minimum boiling point not less than about 110 °C (atmospheric pressure). It is also known to utilize waxy hydrocarbons, preferably having a melting point below about 100 °C. Hydrocarbon suds suppressers are described, for example, in U. S. Patent 4, 265, 779. The hydrocarbons, thus, include aliphatic, alicyclic, aromatic, and heterocyclic saturated or unsaturated hydrocarbons having from about 12 to about 70 carbon atoms. The term "paraffin", as used in this suds suppresser discussion, is intended to include mixtures of true paraffins and cyclic hydrocarbons. Copolymers of ethylene oxide and propylene oxide, particularly the mixed ethoxylated/propoxylated fatty alcohols with an alkyl chain length of from about 10 to about 16 carbon atoms, a degree of ethoxylation of from about 3 to about 30 and a degree of propoxylation of from about 1 to about 10,

are also suitable antifoam compounds for use herein.

- [0118] Other antifoam agents useful herein comprise the secondary alcohols (e.g., 2-alkyl alkanols as described in DE 40 21 265) and mixtures of such alcohols with silicone oils, such as the silicones disclosed in US 4,798,679 and EP 150,872. The secondary alcohols include the C₆-C₁₆ alkyl alcohols having a C₁-C₁₆ chain like the 2-Hexyldecanol commercially available under the trade name ISOFOL 16, 2-Octyldodecanol commercially available under the tradename ISOFOL 20, and 2-butyl octanol, which is available under the trademark ISOFOL 12 from Condea. A preferred alcohol is 2-butyl octanol, which is available from Condea under the trademark ISOFOL 12. Mixtures of secondary alcohols are available under the trademark ISALCHEM 123 from Enichem. Mixed antifoam agents typically comprise mixtures of alcohol to silicone at a weight ratio of about 1:5 to about 5:1. Further preferred antifoam agents are Silicone SRE grades and Silicone SE 47M, SE39, SE2, SE9 and SE10 available from Wacker Chemie; BF20+, DB310, DC1410, DC1430, 22210, HV495 and Q2-1607 ex Dow Corning; FD20P and BC2600 supplied by Basildon; and SAG 730 ex Momentive. Other suitable antifoams, described in the literature such as in Hand Book of Food Additives, ISBN 0-566-07592-X, p. 804, are selected from dimethicone, poloxamer, polypropyleneglycol, tallow derivatives, and mixtures thereof.
- [0119] Preferred among the antifoam agents described above are the silicone antifoams agents, in particular the combinations of polyorganosiloxane with silica particles.
- [0120] The composition may comprise an antifreeze agent. The antifreeze agent as described below is used to improve freeze recovery of the composition.
- [0121] The antifreeze active may be an alkoxyated nonionic surfactant having an average alkoxylation value of from 4 to 22, preferably from 5 to 20 and most preferably from 6 to 20. The alkoxyated nonionic surfactant may have a ClogP of from 3 to 6, preferably from 3.5 to 5.5. Mixtures of such nonionic surfactants may be used.
- [0122] Suitable nonionic surfactants which can be used as the antifreeze agent include in particular the reaction products of compounds having a

hydrophobic group and a reactive hydrogen atom, for example aliphatic alcohols, acids, or alkyl phenols with alkylene oxides, preferably ethylene oxide either alone or with propylene oxide.

- [0123] Suitable antifreeze agents may also be selected from alcohols, diols and esters. A particularly preferred additional antifreeze agent is monopropylene glycol (MPG). Other nonionic antifreeze materials, which are outside the scope of the non-ionic antifreeze component of the present invention but which may be additionally included in the compositions of the invention include alkyl polyglycosides, ethoxylated castor oils, and sorbitan esters.
- [0124] Further suitable antifreeze agents are those disclosed in EP 0018039 including paraffins, long chain alcohols and several esters for example glycerol mono stearate, iso butyl stearate and iso propyl palmitate. Also materials disclosed in US 6,063,754 such as C₁₀₋₁₂ isoparaffins, isopropyl myristate and dioctyladapate.
- [0125] The composition may comprise one or more viscosity control agents, such as polymeric viscosity control agents. Suitable polymeric viscosity control agents include nonionic and cationic polymers, such as hydrophobically modified cellulose ethers (e.g. Natrosol Plus, ex Hercules), cationically modified starches (e.g. Softgel BDA and Softgel BD, both ex Avebe). A particularly preferred viscosity control agent is a copolymer of methacrylate and cationic acrylamide available under the tradename Flosoft 200 (ex SNF Floerger).
- [0126] The composition may comprise a stabilizer. The stabilizer may be a mixture of a water-insoluble, cationic material and a nonionic material selected from hydrocarbons, fatty acids, fatty esters and fatty alcohols.
- [0127] The composition may comprise a floc prevention agent, which may be a nonionic alkoxyated material having an HLB value of from 8 to 18, preferably from 11 to 16, more preferably from 12 to 16 and most preferably 16. The nonionic alkoxyated material can be linear or branched, preferably linear. Suitable floc prevention agents include nonionic surfactants. Suitable nonionic surfactants include addition products of ethylene oxide and/or propylene oxide with fatty alcohols, fatty acids and

fatty amines. The floc prevention agent is preferably selected from addition products of (a) an alkoxide selected from ethylene oxide, propylene oxide and mixtures thereof with (b) a fatty material selected from fatty alcohols, fatty acids and fatty amines.

- [0128] The composition may comprise a polymeric thickening agent. Suitable polymeric thickening agents are water soluble or dispersible. Monomers of the polymeric thickening agent may be nonionic, anionic or cationic. Following is a non-restrictive list of monomers performing a nonionic function: acrylamide, methacrylamide, N-Alkyl acrylamide, N-vinyl pyrrolidone, N-vinyl formamide, N-vinyl acetamide, vinylacetate, vinyl alcohol, acrylate esters, allyl alcohol. Following is a non-restrictive list of monomers performing an anionic function: acrylic acid, methacrylic acid, itaconic acid, crotonic acid, maleic acid, fumaric acid, as well as monomers performing a sulfonic acid or phosphonic acid functions, such as 2-acrylamido-2-methyl propane sulfonic acid (ATBS) etc.. The monomers may also contain hydrophobic groups. Suitable cationic monomers are selected from the group consisting of the following monomers and derivatives and their quaternary or acid salts: dimethylaminopropylmethacrylamide, dimethylaminopropylacrylamide, diallylamine, methylallylamine, dialkylaminoalkyl-acrylates and methacrylates, dialkylaminoalkyl-acrylamides or -methacrylamides.
- [0129] Polymeric thickening agents particularly useful in the composition of the invention include those described in WO2010/078959. These are crosslinked water swellable cationic copolymers having at least one cationic monomer and optionally other nonionic and/or anionic monomers. Preferred polymers of this type are copolymers of acrylamide and trimethylaminoethylacrylate chloride.
- [0130] Preferred polymers comprise less than 25 percent of water soluble polymers by weight of the total polymer, preferably less than 20 percent, and most preferably less than 15 percent, and a cross-linking agent concentration of from 500 ppm to 5000 ppm relative to the polymer, preferably from 750 ppm to 5000 ppm, more preferably from 1000 to 4500 ppm (as determined by a suitable metering method such as that described

on page 8 of patent EP 343840). The cross-linking agent concentration must be higher than about 500 ppm relative to the polymer, and preferably higher than about 750 ppm when the crosslinking agent used is the methylene bisacrylamide, or other cross-linking agents at concentrations that lead to equivalent cross-linking levels of from 10 to 10,000 ppm.

- [0131] The composition of the present invention may take a variety of physical forms including liquid, liquid-gel, paste-like, foam in either aqueous or non-aqueous form, and any other suitable form known by a person skilled in the art. For better dispersibility, a preferred form of the composition is a liquid form, and in the form of an aqueous dispersion in water. When in a liquid form, the composition may also be dispensed with dispensing means such as a sprayer or aerosol dispenser.
- [0132] In some aspects, the composition of the present invention is a liquid fabric conditioning composition. When in the liquid form, the composition may contain from 0.1 % to 20 % by weight of a fabric conditioning agent, in the case of standard (diluted) fabric softener but may contain higher levels from up to 30 % or even 40 % by weight in the case of very concentrated fabric conditioning compositions. The composition usually also contains water and other additives, which may provide the balance of the composition. Suitable liquid carriers are selected from water, organic solvents and mixtures thereof. The liquid carrier employed in the composition is preferably at least primarily water due to its low cost, safety, and environmental compatibility. Mixtures of water and organic solvent may be used. Preferred organic solvents are: monohydric alcohol, such as ethanol, propanol, iso-propanol or butanol; dihydric alcohol, such as glycol; trihydric alcohols, such as glycerol, and polyhydric (polyol) alcohols.
- [0133] The composition of the present invention may be prepared by any mixing means known by a person skilled in the art. Notably, the composition may be prepared by a procedure essentially comprising the following steps:
(i) providing an aqueous dispersion of the nonionic polysaccharide, and optionally the cationic polysaccharide. Other additives may also be added in the aqueous dispersion. Agitation and/or heating may be provided to facilitate the process. In one preferred embodiment, the pH value of the

aqueous dispersion of the polysaccharide is adjusted to be in the range of 3.5 to 5 by using an acidic agent;

(ii) mixing the quaternary ammonium compound with the aqueous dispersion obtained in (i), to give rise to the composition of the present invention. Preferably, the quaternary ammonium compound is melt by heating before the mixing. Agitation and heating can also be provided to facilitate the process.

[0134] Preferably, the pH value of the composition obtained in (ii) is adjusted to be in the range of 2.5 to 8, by using a suitable acidic agent or basic agent. Optional additives may also be added to the composition at this stage.

[0135] In one aspect, the composition of the present invention may be used by contacting the fabric with an aqueous medium comprising the composition. The composition of the present invention can be used in a so-called rinse process. Typically the composition of the present invention is added during the rinse cycle of an automatic laundry machine (such as an automatic fabric washing machine).

[0136] When being used in the rinse process, the composition is first diluted in an aqueous rinse bath solution. Subsequently, the laundered fabrics which have been washed with a detergent liquor and optionally rinsed in a first inefficient rinse step ("inefficient" in the sense that residual detergent and/or soil may be carried over with the fabrics), are placed in the rinse solution with the diluted composition. Of course, the composition may also be incorporated into the aqueous bath once the fabrics have been immersed therein. Following that step, agitation is applied to the fabrics in the rinse bath solution causing the suds to collapse, and residual soils and surfactant is to be removed. The fabrics can then be optionally wrung before drying.

[0137] This rinse process may be performed manually in basin or bucket, in a non-automated washing machine, or in an automated washing machine. When hand washing is performed, the laundered fabrics are removed from the detergent liquor and wrung out. The composition of the present invention may be then added to fresh water and the fabrics are then, directly or after an optional inefficient first rinse step, rinsed in the water

containing the composition according to the conventional rinsing habit. The fabrics are then dried using conventional means.

- [0138] The subject-matter of the invention also includes the use of a component (b) from 0.05 to 10 wt% of a nonionic polysaccharide; for reducing greying of a fabric when using a composition comprising a quaternary ammonium compound and the component (b).
- [0139] Should the disclosure of any patents, patent applications, and publications which are incorporated herein by reference conflict with the description of the present application to the extent that it may render a term unclear, the present description shall take precedence.
- [0140] The following examples are included to illustrate embodiments of the invention. Needless to say, the invention is not limited to the described examples.

Examples

- [0141] The compositions in the following samples were prepared by using the material and procedure as described below :
- [0142] TEP : Di(palmiticcarboxyethyl)hydroxyethyl methyl ammonium methylsulfate; Fentacare TEP softener (from Solvay);
Nonionic guar : a hydroxypropyl guar having an average molecular weight of between 2,000,000 and 3,000,000 Daltons ;
Cationic guar: a guar hydroxypropyltrimonium chloride having an average molecular weight below 1,500,000 Daltons.
- [0143] **Whiteness performance test**
- [0144] Materials
- [0145] Standard white fabrics: polyester/cotton 65/35 (PE/CO), polyester (PE), polyamide 6.6 (PA). Dimensions 20x20 cmxcm, purchased at WFK.
Soil: wfk greying donor, greying swatch I, a new swatch is used per wash cycle.
White cotton ballast load to 3 Kg total weight.
Miele Novotronic WT 945 Washing machines.
- [0146] The ballast load is normalized with 3 washes at 60°C with ECE detergent (WFK) without brightener and bleach. Two pieces of each Standard white fabric are used per machine load. Wash

occurs at 40°C with classic powder laundry detergent (X-tra Total powder 47g/wash) in presence of the greying donor. Tap water is used ~28°TH (280 ppm). At the last rinse 27.5g softener/wash is used, initially put in the dispenser of the machine.

- [0147] Y-value of Y,x,y colour coordinates is obtained by measuring reflectance via spectrophotometer with light source D65 and a UV cut-off filter at 420 nm. Five measurements are taken per fabric piece.
- [0148] The above washing procedure is repeated 5 times. A greying swatch is used per wash cycle.
- [0149] The systems below have been tested:
- [0150]

Table 1

	Sample 1	Sample 2	Sample 3
TEP (wt%)	12	4	4
Nonionic guar (wt%)	0	0,2	0,4
Cationic guar (wt%)	0	0,2	0
Water	Balance	Balance	Balance
Total (wt%)	100	100	100

- [0151] The whiteness results obtained are presented below:
- [0152]

Table 2

Standard Fabric	Property measured	N° of wash	Sample 1	Sample 2	Sample 3

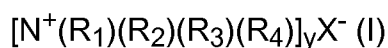
Polyester /Cotton 65/35	Y-value of Y,x,y colour coordinates	wash 0	95	95	95
		wash 2	90	94	93
		wash 5	82	91	92
Polyester		wash 0	95	95	95
		wash 2	85	91	91
		wash 5	76	89	91

[0153] We observe that TEP 12 wt% (Sample 1) presents progressive important greying after 2 and 5 washes on PE/CO and PE fabrics, the greying being more pronounced in the latter.

[0154] The composition comprising TEP 4 wt% and nonionic guar, and the composition comprising TEP 4 wt%, nonionic guar and cationic guar (Sample 2 and 3) present only very slight greying after 5 washes on PE/CO and PE and have positively impact the whiteness performance.

Claims

1. A method for reducing greying of a fabric by using a composition comprising:
(a) from 0.2 to 9 wt% of a quaternary ammonium compound; and (b) from 0.05 to 10 wt% of a nonionic polysaccharide, based on the total weight of the composition.
2. The method according to claim 1, wherein the composition comprises from 1 to 8 wt% of the quaternary ammonium compound based on the total weight of the composition.
3. The method according to claim 1 or 2, wherein the composition comprises from 3 to 5 wt% of the quaternary ammonium compound based on the total weight of the composition.
4. The method according to any one of claims 1 to 3, wherein the composition comprises less than 1 wt% of a cationic polysaccharide based on the total weight of the composition.
5. The method according to claims 4, wherein the composition comprises from 0.05 to 0.4 wt% of the cationic polysaccharide based on the total weight of the composition.
6. The method according to any one of claims 1 to 5, wherein the nonionic polysaccharide is a nonionic cellulose or a nonionic guar.
7. The method according to any one of claims 1 to 6, wherein the nonionic polysaccharide is a nonionic guar.
8. The method according to any one of claims 1 to 7, wherein the fabric is a synthetic fabric.
9. The method according to any one of claims 1 to 8, wherein the composition is a fabric conditioning composition.
10. The method according to any one of claims 1 to 9, wherein the quaternary ammonium compound has the general formula (I) :

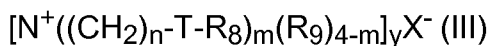


wherein: R_1 , R_2 , R_3 and R_4 , which may be the same or different, is a C_1 - C_{30} hydrocarbon group, optionally containing a heteroatom or an ester or amide group;

X is an anion;

y is the valence of X .

11. The method according to any one of claims 1 to 10, wherein the quaternary ammonium compound has the general formula (III) :



wherein :

R₈ group is independently selected from C₁-C₃₀ alkyl or alkenyl group;

R₉ group is independently selected from C₁-C₄ alkyl or hydroxylalkyl group;

T is -C(O)-O- or -O-C(=O)-;

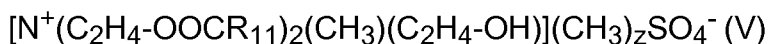
n is an integer from 0 to 5;

m is selected from 1, 2 and 3;

X is an anion;

y is the valence of X.

12. The method according to any one of claims 1 to 11, wherein the quaternary ammonium compound has the general formula (V) :



wherein R₁₁ is a C₁₂-C₂₀ alkyl group;

z is an integer from 1 to 3.

13. The method according to claim 1, wherein the quaternary ammonium compound is chosen from the group consisting of :

TET : Di(tallowcarboxyethyl)hydroxyethyl methyl ammonium methylsulfate;

TEO : Di(oleocarboxyethyl)hydroxyethyl methyl ammonium methylsulfate;

TES : Distearyl hydroxyethyl methyl ammonium methylsulfate;

TEHT : Di(hydrogenated tallow-carboxyethyl)hydroxyethyl methyl ammonium methylsulfate;

TEP : Di(palmiticcarboxyethyl)hydroxyethyl methyl ammonium methylsulfate;

DEEDMAC : Dimethylbis[2-[(1-oxooctadecyl)oxy]ethyl]ammonium chloride;

and

DHT : Dihydrogenated tallowdimethylammonium chloride.

14. The method according to any one of claims 1 to 13, wherein the fabric is contacted with an aqueous medium comprising the composition.
15. Use of a component (b) from 0.05 to 10 wt% of a nonionic polysaccharide for reducing greying of a fabric when using a composition comprising a quaternary ammonium compound and the component (b).

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/050721

A. CLASSIFICATION OF SUBJECT MATTER
INV. C11D1/62 C11D3/22
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
C11D
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		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE WPI Week 198927 Thomson Scientific, London, GB; AN 1989-195723 XP002658238, & JP H01 132691 A (LION CORP) 25 May 1989 (1989-05-25) abstract	1-15
A	----- WO 2004/044113 A2 (COLGATE PALMOLIVE CO [US]) 27 May 2004 (2004-05-27) claim 1	1-15
A	----- WO 2007/118732 A1 (UNILEVER PLC [GB]; UNILEVER NV [NL]; UNILEVER HINDUSTAN [IN]; ZHU YUN-) 25 October 2007 (2007-10-25) page 9, line 28 - page 10, line 3; example 4; tables 5-8 ----- -/--	1-15

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search 11 February 2016	Date of mailing of the international search report 19/02/2016
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Saunders, Thomas

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/050721

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 320 296 A2 (UNILEVER PLC [GB]; UNILEVER NV [NL]) 14 June 1989 (1989-06-14) example 3A -----	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2016/050721

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP H01132691	A	25-05-1989	JP 2519953 B2 31-07-1996
			JP H01132691 A 25-05-1989

WO 2004044113	A2	27-05-2004	AT 349507 T 15-01-2007
			AU 2003291444 A1 03-06-2004
			BR 0316260 A 11-10-2005
			CA 2506255 A1 27-05-2004
			CN 1738893 A 22-02-2006
			DE 60310755 T2 11-10-2007
			DK 1560905 T3 10-04-2007
			EP 1560905 A2 10-08-2005
			IL 168583 A 30-06-2011
			JP 2006506542 A 23-02-2006
			MX PA05005144 A 22-07-2005
			US 2004097395 A1 20-05-2004
			WO 2004044113 A2 27-05-2004
			ZA 200504579 A 30-08-2006

WO 2007118732	A1	25-10-2007	AR 060482 A1 18-06-2008
			AT 509086 T 15-05-2011
			BR PI0711033 A2 06-03-2012
			CA 2636842 A1 25-10-2007
			CN 101421381 A 29-04-2009
			EP 2007860 A1 31-12-2008
			ES 2365634 T3 07-10-2011
			JP 2009534544 A 24-09-2009
			US 2007249516 A1 25-10-2007
			WO 2007118732 A1 25-10-2007
ZA 200805952 A 28-10-2009			

EP 0320296	A2	14-06-1989	DE 3888477 D1 21-04-1994
			DE 3888477 T2 23-06-1994
			EP 0320296 A2 14-06-1989
			ES 2063052 T3 01-01-1995
			JP H021800 A 08-01-1990
