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## (54) Fabric conditioning composition.

(57) A fabric conditioning composition comprises a cationic fabric softening agent, an amine and an amphoteric material which is preferably an amine oxide. The combination of the three components leads to an improvement in the softening benefit, delivered to the fabrics even in the presence of anionic surface active materials carried over from the wash cycle of a fabric laundering process. A method of use of the compositions is also disclosed.

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# FABRIC CONDITIONING COMPOSITION

This invention relates to a fabric conditioning composition suitable for conditioning fabrics during the rinse step of a fabric laundry process or during the drying stage in a tumble dryer device.

It is known to treat fabrics with a fabric conditioning composition following a fabric washing process which often involves the use of anionic surface active materials.

In the treatment of fabrics in a tumble dryer it is known in the art to add one or more conditioning agents. For instance, for imparting a softening benefit to fabrics, it is known from CA 1 005 204 ( Procter and Gamble) to co-mingle fabrics in a tumble dryer with a flexible substrate carrying a normally solid fabric conditioning agent. It is also known from EP 95 335, EP 144 186 and EP 204 484, to add powdered conditioning agents during the tumble drying of fabrics.

In the treatment of fabrics in the rinse cycle of a fabric laundry process it is known in the art to add one or more conditioning agents. For instance it is known from British Patent Specification 1 260 584 (ARMOUR) to soften fabrics in the rinse cycle by the use of a composition containing a quaternary ammonium compound and a tertiary amine oxide.

It is known that anionic surface active materials carried over from the wash cycle of the fabric laundry process can have a detrimental effect on the effectiveness of fabric conditioning compositions containing fabric softening agents which are used in the rinse step or the drying step of the fabric laundry process. This problem can be alleviated if the fabrics are thoroughly rinsed before they are treated with a fabric conditioner, alternatively this problem can possibly be overcome by using fabric conditioning compositions which are not as sensitive to the presence of anionic surface active agents. Furthermore, it is known from European patent 63 899 (UNILEVER), to overcome the problem of anionic carry-over by the use of anionic scavengers, such as aluminium chlorohydrate.

It is an object of the present invention to provide fabric conditioning compositions which provide improved softening benefits to fabrics, in the absence, but also in the presence of anionic carry-over.

It is a further object of the present invention to provide fabric conditioning compositions which are stable, easy to prepare especially when manufacturing a product with a viscosity above 100 mPas, and which have an attractive creamy appearance.

We have now surprisingly discovered that one or more of the above mentioned objects can be fulfilled if in the fabric conditioning composition a cationic fabric softening agent is combined with certain other components.

Thus, accordingly there is provided a fabric conditioning composition comprising:

(i) a cationic fabric softening agent;

(ii) an amine; and

(iii) an amphoteric fabric conditioning material.

The fabric conditioning article according to the invention can alternatively be liquid, semi-solid or solid. Preferred embodiments of a fabric conditioning composition are aqueous liquid detergent compositions, fabric conditioning compositions, which are applied to a substrate for use in the tumble dryer, and solid powdered compositions for use in a tumble dryer.

If the fabric conditioning composition is an aqueous liquid detergent composition, it is preferred that based on the total weight of the components (i) to (iii) the weight of (i) is at least 20 %, the weight of (ii) is at least 5% and the weight of (iii) is at least 5%.

If the fabric conditioning composition is applied to a substrate for use in a tumble dryer or is in solid form for use in a tumble dryer then it is preferred that based on the total weight of components (i) to (iii), each component is present at a level of at least 5%.

## Detailed descriotion of the invention

Fabric conditioning compositions according to the present invention comprise at least the following three active ingredients:

(i) a cationic fabric softening agent

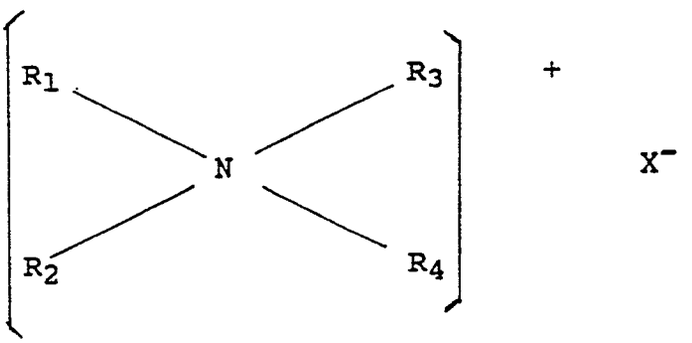
(ii) an amine

(iii) an amphoteric fabric conditioning material

The cationic fabric softening agent

Preferably the cationic fabric softener material is a cationic material which is water-insoluble in that these materials have a solubility in water at pH 2.5 and 20° C of less than 10 g/l. Highly preferred materials are cationic quaternary ammonium salts having two C12-24 hydrocarbyl chains.

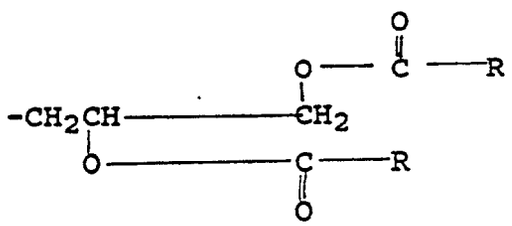
Well-known species of substantially water-insoluble quaternary ammonium compounds have the formula



wherein $R_1$ and $R_2$ represent hydrocarbyl groups from about 12 to about 24 carbon atoms; $R_3$ and $R_4$ represent hydrocarbyl groups containing from 1 to about 4 carbon atoms; and X is an anion, preferably selected from halide, methyl sulfate and ethyl sulfate radicals.

Representative examples of these quaternary softeners include ditallow dimethyl ammonium chloride; ditallow dimethyl ammonium methyl sulfate; dihexadecyl dimethyl ammonium chloride; di(hydrogenated tallow) dimethyl ammonium methyl sulfate; dihexadecyl diethyl ammonium chloride; di(coconut) dimethyl ammonium chloride. Ditallow dimethyl ammonium chloride, di(hydrogenated tallow) dimethyl ammonium chloride, di(coconut) dimethyl ammonium chloride and di(coconut) dimethyl ammonium methosulfate are preferred.

Suitable materials also include dialkyl ethoxyl methyl ammonium methosulphate based on soft fatty acid, dialkyl ethoxyl methyl ammonium methosulphate based on hard fatty acid, and a material in which $R_3$ and $R_4$ represent methyl, $R_1$ is $C_{13-15}$, $R_2$ is $CH_2CH_2OCOR$, where R is stearyl, and X is methosulphate. Materials in which $R_2$, $R_3$ and $R_4$ each represent methyl, $R_1$ is the group

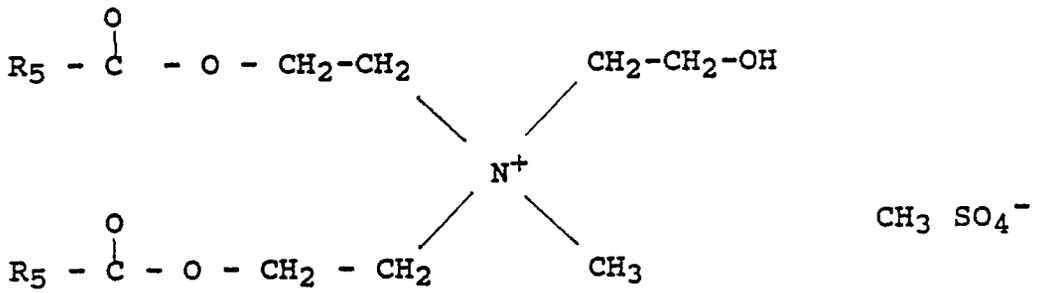


where R is hardened tallow and X is methosulphate are also suitable. Ditallow dimethyl ammonium chloride, di(hydrogenated tallow alkyl) dimethyl ammonium chloride, di(coconut alkyl) dimethyl ammonium chloride and di(coconut alkyl) dimethyl ammonium methosulfate are preferred.

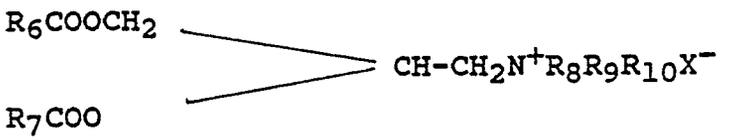
Other preferred cationic compounds include those materials as disclosed in EP 239,910 (P&G), which is included herein by reference.

In this specification the expression hydrocarbyl group refers to alkyl or alkenyl groups optionally substituted or interrupted by functional groups such as -OH, -O-, -CONH, -COO-, etc.

Other preferred materials are the materials of formula

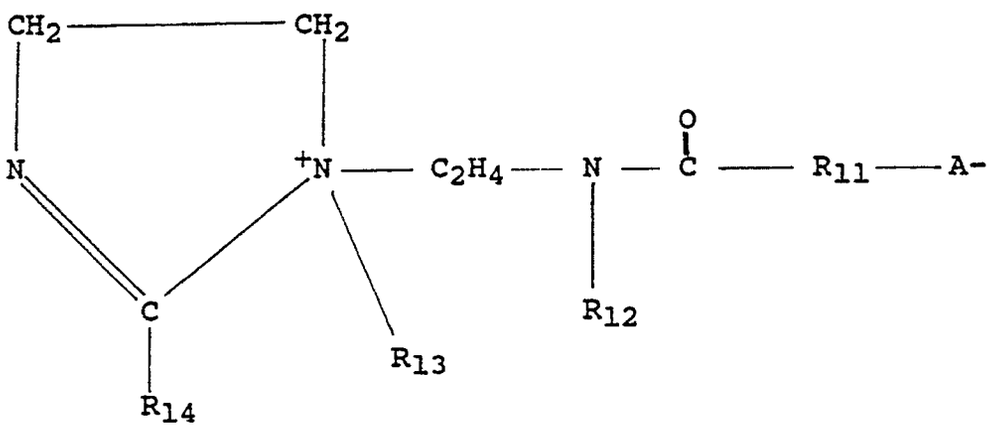


$R_5$ being partially hardened tallow, which is available from Stepan under the tradename Stepantex VRH 90 and



where $R_8$, $R_9$ and $R_{10}$ are each alkyl or hydroxyalkyl groups containing from 1 to 4 carbon atoms, or a benzyl group. $R_6$ and $R_7$ are each an alkyl or alkenyl chain containing from 11 to 23 carbon atoms, and $X^-$ is a water soluble anion, substantially free of the corresponding monoester.

Another class of preferred water-insoluble cationic materials are the hydrocarbylimidazolinium salts believed to have the formula:



wherein $R_{13}$ is a hydrocarbyl group containing from 1 to 4, preferably 1 or 2 carbon atoms, $R_{11}$ is a hydrocarbyl group containing from 8 to 25 carbon atoms, $R_{14}$ is an hydrocarbyl group containing from 8 to 25 carbon atoms and $R_{12}$ is hydrogen or an hydrocarbyl containing from 1 to 4 carbon atoms and $A^-$ is an anion, preferably a halide, methosulfate or ethosulfate.

Preferred imidazolinium salts include 1-methyl-1-(tallowylamido-) ethyl -2-tallowyl- 4,5-dihydro imidazolinium methosulfate and 1-methyl-1-(palmitoylamido)ethyl -2-octadecyl-4,5- dihydroimidazolinium chloride. Other useful imidazolinium materials are 2-heptadecyl-1-methyl-1- (2-stearylamido)ethyl-imidazolinium chloride and 2-lauryl-1-hydroxyethyl-1-oleyl-imidazolinium chloride. Also suitable herein are the imidazolinium fabric softening components of US patent No 4 127 489, incorporated by reference.

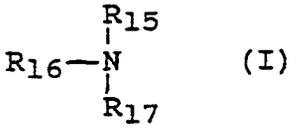
Representative commercially available materials of the above classes are the quaternary ammonium compounds Arquad 2HT (ex AKZO); Noramium M2SH (ex CEKA); Aliquat-2HT (Trade Mark of General Mills Inc), Stepantex Q185 (ex Stepan); Stepantex VP85 (ex Stepan); Stepantex VRH90 (ex Stepan); Synprolam FS (ex ICI) and the imidazolinium compounds Varisoft 475 (Trade Mark of Sherex Company, Columbus Ohio) and Rewoquat W7500 (Trade Mark of REWO).

The amines

The compositions according to the invention also contain in addition to cationic fabric softening agents, one or more amines.

The term "amine" as used herein can refer to

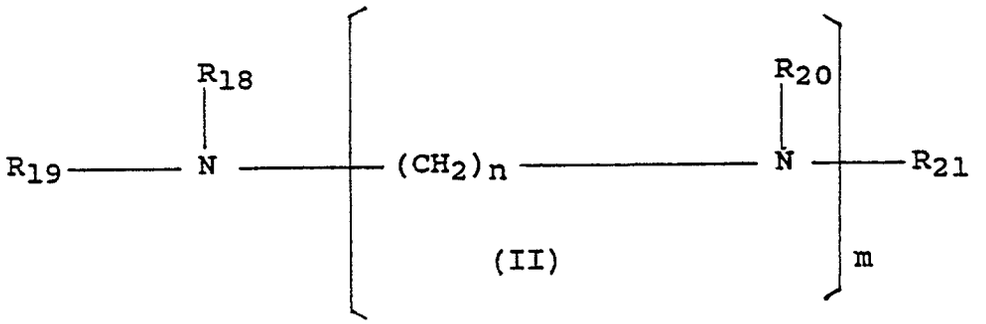
(i) amines of formula



(I)

wherein $R_{15}$, $R_{16}$ and $R_{17}$ are defined as below;

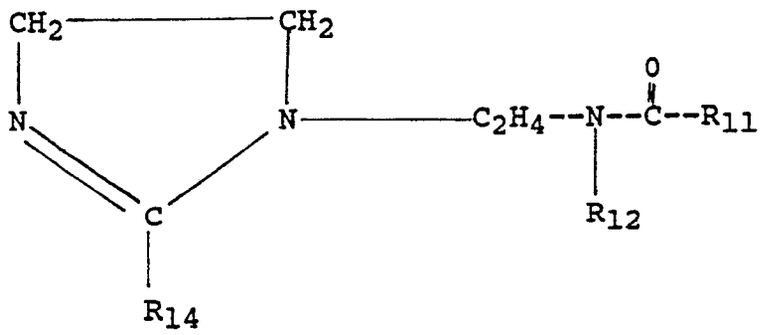
(ii) amines of formula



(II)

wherein $R_{18}$, $R_{19}$, $R_{20}$ and $R_{21}$, m and n are defined as below.

(iii) imidazolines of formula



III

wherein $R_{11}$, $R_{12}$ and $R_{14}$ are defined as above.

(iv) condensation products formed from the reaction of fatty acids with a polyamine selected from the group consisting of hydroxy alkylalkylenediamines and dialkylenetriamines and mixtures thereof. Suitable materials are disclosed in European Patent Application 199 382 (Procter and Gamble), incorporated herein by reference.

When the amine is of the formula I above, $R_{15}$ is a $C_6$ to $C_{24}$, hydrocarbyl group, $R_{16}$ is a $C_1$ to $C_{24}$ hydrocarbyl group and $R_{17}$ is a $C_1$ to $C_{10}$ hydrocarbyl group. Suitable amines include those materials from which the quaternary ammonium compounds disclosed above are derived, in which $R_{15}$ is $R_1$, $R_{16}$ is $R_2$ and $R_{17}$ is $R_3$. Preferably, the amine is such that both $R_{15}$ and $R_{16}$ are $C_6$-$C_{20}$ alkyl with $C_{16}$-$C_{18}$ being most preferred and with $R_{17}$ as $C_{1-3}$ alkyl, or $R_{15}$ is an alkyl or alkenyl group with at least 22 carbon atoms and $R_{16}$ and $R_{12}$ are $C_{1-3}$ alkyl. preferably thee amines are protonated with hydrochloric acid, orthophosphoric acid (OPA), $C_{1-5}$ carboxylic acids or any other similar acids, for use in the fabric conditioning compositions of the invention.

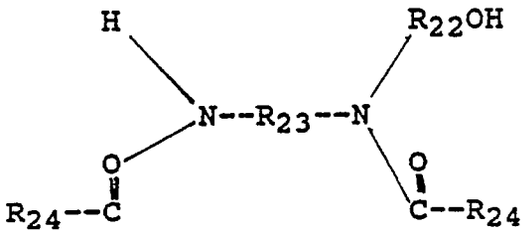
When the amine is of formula II above, $R_{18}$ is a $C_6$ to $C_{24}$ hydrocarbyl group, $R_{19}$ is an alkoxylated group of formula $-(CH_2CH_2O)_yH$, where y is within the range from 0 to 6, $R_{20}$ is an alkoxylated group of formula $-(CH_2CH_2O)_zH$ where z is within the range from 0 to 6 and m is an integer within the range from 0 to 6, and is preferably 3. When m is 0, it is preferred that $R_{18}$ is a $C_{16}$ to $C_{22}$ alkyl and that the sum total of

z and y is within the range from 1 to 6, more preferably 1 to 3. When m is 1, it is preferred that $R_{18}$ is a $C_{16}$ to $C_{22}$ alkyl and that the sum total of x and y and z is within the range from 3 to 10.

Representative commercially available materials of this class include Ethomeen (ex Armour) and Ethoduomeen (ex Armour).

Preferably the amines of type (ii) or (iii) are also protonated for use in the fabric conditioning compositions of the invention.

When the amine is of type (iv) given above, a particularly preferred material is



where $R_{22}$ and $R_{23}$ are divalent alkenyl chains having from 1 to 3 carbons atoms, and $R_{24}$ is an acyclic aliphatic hydrocarbon chain having from 15 to 21 carbon atoms. A commercially available material of this class is Ceranine HC39 (ex Sandoz).

The amphoteric fabric conditioning material

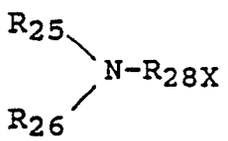
The amphoteric fabric conditioning material for use in a composition according to the invention should be a fabric substantive amphotheric material. Suitable amphoteric materials form a particulate dispersion at a concentration of less than 1 g/l at at least one temperature between 0 and 100 ° C. For the purpose of this invention a fabric substantive amphoteric material is preferably an amphoteric or zwitterionic tertiary or quaternary ammonium compound having either one single very long hydrocarbyl side chain or two long hydrocarbyl chains. From these compounds the use of amphoteric or zwitterionic ammonium compounds having two long hydrocarbyl chains is particularly preferred for many reasons including costs, ease of processing and better stability and performance.

It is all-ready known, for instance from US 3,984,335 (BASF company) to use a fatty amphoteric compound having one long hydrocarbyl chain in liquid fabric softening components. Single very long chain amphoteric or zwitterionic materials as used in compositions according to the invention are distinctive over these materials in that the very long hydrocarbyl chain contains a substantial higher amount of C-atoms. For the purpose of the invention this single very long hydrocarbyl chain contains preferably from 16-50 C-atoms, more preferred from 22-50 C-atoms, particularly preferred from 24 to 40 C-atoms.

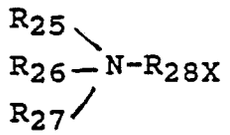
Amphoteric or zwitterionic ammonium compounds preferably have two long hydrocarbyl chains, each chain having 8-24 C-atoms, preferably 10-20 C-atoms, most preferred around 16 C-atoms.

Suitable amphoteric fabric substantive materials for use in a fabric treatment composition according to the invention are for instance:

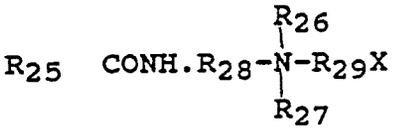
I) Ampholytes of the following formula:



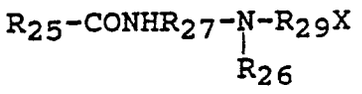
II) Hydrocarbyl betaines of the following formula:



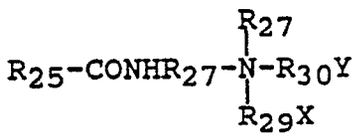
III) Hydrocarbylamido betaines of the following formula:



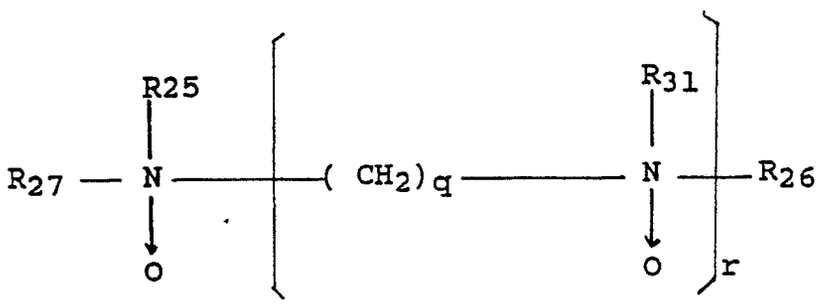
IV) Glycinates or propionates of the following formula:



or



V) tertiary amine oxides of the following formula



wherein:

a) $R_{25}$ and $R_{26}$ are $C_{8-25}$ hydrocarbyl chains, $R_{27}$ is an hydrocarbylgroup containing 1-4 carbon atoms or a group $-(CH_2,CH_2O)_nH$, $R_{28}$, $R_{29}$, $R_{30}$ are $-(CH_2)^-$, which can be interrupted with -O-,-CONH-,-COO- etc, $R_{31}$ is $R_{27}$, r is 0 or 1, n is an integer from 1-6, X, Y are $SO_3$, $SO^{2-}$ or $COO^-$; or

b) $R_{25}$ is a $C_{16-50}$ hydrocarbyl chain, $R_{26}$, $R_{27}$ are hydrocarbyl groups containing 1-4 carbon atoms or a group $-(CH_2CH_2O)_nH-$, $R_{28}$, $R_{29}$, $R_{30}$ are $-(CH_2)n-$ which can be interrupted by -O-, -COHN-, -COO- etc, $R_{31}$ is $R_{27}$, r is 0 or 1, n is an integer from 1-6, X, Y are $SO_3$, $SO^{2-}$ or $COO^-$.

Preferably the amphoteric fabric substantive materials are water insoluble and have a solubility in water at pH 2.5 at 20 ° C of less than 10 g/l.

The HLB of the amphoteric fabric substantive material is preferably less than 10.0.

Examples of amphoteric materials of the above groups and their method of preparation are given in our co-pending European patent application 89200113.2.

From the above listed materials, particularly the group V materials are preferred, especially those amine oxides containing two hydrocarbyl groups with at least 14 C-atoms, such as dihardened tallow methyl amine oxide, or one hydrocarbyl group with at least 22 carbon atoms. Amine oxides have been found to provide particularly advantageous softening effects, furthermore compositions comprising amine oxides are clearly preferred because they are generally easy to prepare, are stable and have an interesting creamy appearance.

Optional ingredients

Preferably, the compositions of the present invention contain substantially no anionic material, in particular no anionic surface active material. If such materials are present, the weight ratio of the cationic fabric softening agent to the anionic material should preferably be more than 5:1.

The composition can also contain one or more optional ingredients selected from non-aqueous solvents such as $C_1$-$C_4$ alkanols and polyhydric alcohols, pH buffering agents such as strong or weak acids eg. HCl, $H_2SO_4$, phosphoric, benzoic or citric acids (the pH of the liquid compositions ie preferably less than 5.0), rewetting agents, viscosity modifiers such as electrolytes, for example calcium chloride, antigelling agents, perfumes, perfume carriers, fluorescers, colourants, hydrotropes, antifoaming agents, antiredeposition agents, enzymes, optical brightening agents, opacifiers, stabilisers such as guar gum and polyethylene glycol, emulsifiers, anti-shrinking agents, anti-wrinkle agents, fabric crisping agents, anti-spotting agents, soil-release agents, germicides, linear or branched silicones, fungicides, anti-oxidants, anti-corrosion agents, preservatives such as Bronopol (Trade Mark), a commercially available form of 2-bromo-2-nitropropane-1,3-diol, dyes, bleaches and bleach precursors, drape imparting agents, antistatic agents, anti-redeposition agents, dye transfer inhibitors and ironing aids.

These optional ingredients, if added, are each present at levels up to 5% by weight of the composition. The pH of the composition is preferably 5 or below, or adjusted thereto.

Anti-redeposition agents particularly preferred in the compositions according to the invention are polymers. Suitable polymers include alkyl and hydroxoyalkyl cellulose ethers, such as methyl cellulose, and polyvinylpyrrolidone.

Silicones can be included in the compositions as the ironing aid, rewetting agent or the antifoaming agent. Suitable silicones for use in the compositions according to the invention include predominantly linear polydialkyl or alkylaryl siloxanes in which the alkyl groups contain one to five carbon atoms. The siloxanes can be amido or amino substituted. When the siloxane is amine substituted the amine group may be quaternised.

The compositions may also contain, in addition to the cationic fabric softening agent, other non-cationic fabric softening agents, such as nonionic fabric softening agents. Suitable nonionic fabric softening agents include glycerol esters, such as glycerol monostearate, fatty alcohols, such as stearyl alcohol, alkoxylated fatty alcohols $C_9$-$C_{24}$ fatty acids and lanolin and derivatives thereof. Suitable materials are disclosed in European Patent Application 88 520 (Unilever PLC/NV case C 1325), 122 141 (Unilever PLC/NV case C 1363) and 79 746 (Procter and Gamble), the disclosures of which are incorporated herein by reference. Typically such materials are included at a level within the range of from 0.5% to 10% by weight of the composition.

Liquid compositions

One preferred embodiment of a composition according to the present invention is an aqueous liquid fabric conditioning composition comprising cationic fabric softener, the amine and the amphoteric softener material. The amphoteric softener material is preferably an amine oxide.

The total level of the three ingredients in a liquid composition is preferably from 1 to 60% more preferred from 3 to 30% by weight of the composition. Preferably, based on the total weight of the three actives, the weight of the cationic softening agent is not more than 90%, preferably between 25 and 75 %, more preferred from 40 to 60 %. especially preferred about 50 %. The weight of the amine is not more than 70%. preferably between 10 and 60%, more preferred between 15 and 40 %, especially preferred about 25 %. The weight of the amphoteric material is not more than 60 %. If the amphoteric material is an amine oxide then this constitutes preferably less than 60 %, more preferred between 10 and 50 %, especially preferred between 15 and 40 %, most preferred about 25 % based on the weight of the three actives.

The optimum weight ratio of the three active components in the fabric conditioning composition depends on the level of anionic carried over from the wash cycle. We have found that a weight ratio of cationic fabric softener to amine to amine oxide of about 2:1:1 provides good results under most conditions of use.

The liquid compositions according to the inventions may be prepared by a variety of methods. One suitable method is to form a molten mixture of the cationic fabric softening agent, amine and amphoteric material, which is then added to water with stirring to form a dispersion and thereafter adding any optional ingredients.

In use, the fabric conditioning composition of the invention may be added to a large volume of water to form a liquor with which the fabrics to be treated are contacted. Generally, the total concentration of the cationic fabric softening agent, the amine and the amine oxide in this liquor will be between about 30 ppm

and 500 ppm. The weight ratio of the fabrics to liquor will generally be between 40:1 and 4:1.

If the compositions of the invention are added to water which contains high levels of anionic surface active materials, a further improvement can be obtained if the compositions contain anionic scavengers such as low molecular weight cationics. Suitable materials include cationic compounds which have a solubility in water at pH 2.5 and 20 °C of more than 5 g/l, preferably more than 10 g/l. Arquad 18 is a particularly preferred material. (Arquad 18 is a commercially available form of hardened tallow trimethyl ammonium chloride).

Tumble dryer products

Another preferred embodiment of the present invention involves the combination of a substrate and a mixture of active ingredients comprising a cationic fabric conditioner, an amine and an amphoteric material. Also in these compositions the amphoteric material is preferably an amine oxide.

The substrate for use in a fabric conditioning article according to the present invention may take any one of a variety of shapes such as blocks, rods, flakes, balls or sheets. Preferably the conditioning article comprises one or more flexible sheet substrates.

Such substrates are well-known in the art and include woven and non-woven fibrous substrates, polymeric substrates, extruded substrates etc. Suitable substrates are for instance disclosed in CA 1 005 204 (Procter and Gamble).

Combinations of a substrate and a fabric conditioner according to the invention may be prepared by any suitable method for the application of active materials onto a substrate. Such a method may for instance include the coating or impregnation of the substrate with the fabric conditioner. When using such a method, it may be preferred to combine the active materials with a solvent for these, followed by applying the solution to the substrate and evaporating said solvent, for instance under low pressure conditions.

Others suitable methods for combining the substrate with the fabric conditioner material include the sprinkling of the materials in solid form onto the substrate and the application of the materials in melted form onto the substrate.

Preferably the add-on ratio of the fabric conditioning material to the substrate is between 20:1 and 1:20, more preferred between 1:1 and 10:1. Especially preferred is a combination of a substrate and a fabric conditioner material, in which the total amount of conditioner material is 0.5 and 10 g, more preferred between 0.75 and 7.5 g, especially preferred between 1 and 5 g.

Another preferred embodiment of a fabric conditioning composition according to the present invention is a composition which is solid, preferably in the form of a powdered material. These materials are preferably used during the treatment of the fabrics in a tumble dryer. In this use they may for instance be contained in a sachet or another dispensing container. Suitable containers for use in the tumble dryer are for instance disclosed in EP 194 813 (Unilever N.V.).

In use the solid fabric conditioner composition according to the present invention are preferably used in amounts of between 0.5 and 10 g, preferably from 1 to 5 g, especially preferred from 1.5 to 3 g active material.

The fabric conditioner compositions for application to the substrate or for use in solid form comprise, based on the weight of the three active materials, more than 5 % fabric softener material, more than 5 % amine and more than 5 % amphoteric material. Preferably the amount of fabric softener material is from 5 to 90 %, more preferred from 20 to 85%, especially preferred about 80 %. The weight of the amine is preferably from 5 to 50 %, more preferred from 5 to 40 %, especially preferred from 5 to 35 %, most preferred about 10 %. The weight of the amphoteric material is preferably from 5 to 90%, if the amphoteric material is an amine oxide, the weight of this material is preferably from 5 to 50%, more preferred from 5 to 35 %, especially preferred from 5 to 25 %, typically about 10%.

The optimum weight ratio of the three active components in the fabric conditioning composition containing amine oxide is cationic: amine to amine oxide = 8 : 1 : 1.

The invention will now be illustrated by the following non limiting Examples, where Examples 1A, 1B, 2A and 2B are included for comparison purposes only. In all of the Examples, all parts and percentages are by weight. Where commercially available materials are referred to, the percentages quoted are those of the active ingredient therein.

Examples 1-2

Compositions were prepared according to the formulations in the following tables. The compositions were prepared by comelting the cationic fabric softening agent, amine and amine oxide at 80 ° C. (When the amine was Armeen M2HT, the ortho phosphoric acid was added to the water prior to forming the co-melt. In contrast when Ceranine HC39 was used, the acid was added after the components were dispersed). The comelt thus formed was added to water at 80 ° C and then soniprobed for a few minutes to form a disperion which was then cooled to room temperature.

The compositions were tested as follows -

40 grams of cotton terry toweling were washed for 5 minutes at 50 ° C with a commercially available washing powder product, UK Persil Automatic, in a litre of Wirral water (10 ° FH) in a tergotometer. 5 grams of the washing powder product was used. After separating the wash liquor, the fabric load was rinsed twice at 25 ° C with Wirral water. 4ml of a test composition was added to the second rinse. After line drying, the fabric load was assessed for softness by a panel of experts using a paired comparison test.

| EXAMPLE NO. | 1 | 1A | 1B | 2 | 2A | 2B |
|---|---|---|---|---|---|---|
| Ingredient % | | | | | | |
| Arquad 2HT[1] | 2.5 | 2.5 | - | 2.5 | 2.5 | - |
| Armeen M2HT[2] | 1.25 | - | 2.5 | - | - | - |
| DHTMAO[3] | 1.25 | 2.5 | 2.5 | 1.25 | 2.5 | 2.5 |
| Ceranine HC39[4] | - | - | - | 1,25 | - | 2.5 |
| OPA | 0.25 | - | 0.50 | 0.25 | - | 0.50 |
| Water | balance | | | | | |

1 - Dihardened tallow dimethyl ammonium chloride (ex Akzo)
2 - Dihardened tallow methylamine (ex Akzo)
3 - Dihardened tallow methyl amine oxide (ex (Kenobel)
4 - Reaction product of two moles of hardened tallow fatty acid with one mole of N-2-hydroxyethyl ethylene diamine (ex Sandoz).

The results of the softness showed a preference for composition 1 over compositions 1A and 1B ie. the ternary system, containing the cationic, amine and amine oxide, gave the best softening. The same result was obtained when compositions 2, 2A and 2B were compared.

Compositions 1 and 2 were also compared. The results showed a preference for the product containing Ceranine HC39.

Examples 3-6

In these Examples, a comparison was made between ternary compositions in which the amine was either protonated or unprotonated. Compositions were prepared according to the formulations in the table by the method described above.

| Example | 3 | 4 | 5 | 6 |
|---|---|---|---|---|
| Arquad 2HT | 2.5 | 2.5 | 2.5 | 2.5 |
| Armeen M2HT | | | | |
| (i) protonated with OPA | 1.25 | - | - | - |
| (ii) not protanated | - | 1.25 | - | - |
| DHTMAO | 1.25 | 1.25 | 1.25 | 1.25 |
| Ceranine HC39 | | | | |
| (i) protonated with OPA | - | - | 1.25 | - |
| (ii) not protanated | - | - | - | 1.25 |
| OPA | 0.25 | - | 0.25 | - |
| Water | balance | | | |

The compositions were tested according to the method described in Examples 1 and 2.

The results show a preference for composition 3 which contained a protonated amine, over composition 4.

When Ceranine HC39 was the amine used, Examples 5 and 6, compositions containing the protonated and unprotonated material, gave similar results.

## EXAMPLES 7-15

The following compositions according to the invention were prepared by the method described above.

| Example | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|
| Arquad 2HT | 3.5 | 3.5 | | | 2.5 | 2.5 | 2.5 | 2.5 | 7 |
| Imidazoline 2HT[5] | | | 2.5 | | | | | | |
| Stepantex VRH90[6] | | | | 2.5 | | | | | |
| Arquad 18[7] | | | | | 1.0 | | | | |
| Arquad 2C[8] | | | | | | 0.25 | | | |
| DHTMAO | 0.5 | 1.0 | 1.25 | 1.25 | 0.75 | 1.25 | | 1.25 | 3.5 |
| $C_{22}$ dimethyl amine oxide | | | | | | | 1.25 | | |
| Imidazoline amine[9] | | | | | | | | 1.25 | |
| OPA | 0.2 | 0.1 | 0.25 | 0.25 | 0.15 | 0.2 | 0.25 | | 0.7 |
| Armeen M2HT | 1.0 | 0.5 | 1.75 | 1.25 | 0.75 | 1.0 | 1.25 | | 3.5 |
| Water | ---------- balance ---------- | | | | | | | | |



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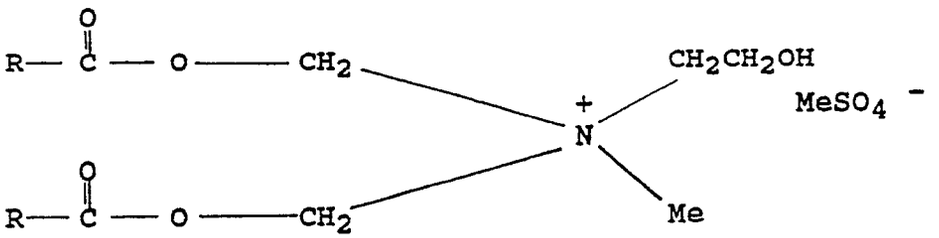
5 - A dihardened tallow methyl imidazolinium salt

6 -




R=hardened tallow

7 - Hardened tallow trimethyl ammonium chloride

8 - Dicocodimethyl ammonium chloride

9 - Dihardened tallow imidazoline amine.

Examples 16-21

The following compositions according to the invention were prepared by the method described above

| Example | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|
| Arquad 2HT | 7.5 | 6.75 | 7.50 | 8.5 | 7.5 | 5.1 |
| Ceranine HC39 | 3.75 | 3.375 | 3.75 | - | - | 8.5 |
| Ceranine HCA | - | - | - | 4.25 | 3.75 | - |
| DHTMAO | 3.75 | 3.375 | 3.75 | 4.25 | 3.75 | 3.4 |
| Dobanol 25-9 | - | - | 1.00 | - | - | - |
| OPA | 0.75 | 0.22 | 0.75 | 0.85 | 0.75 | 0.70 |
| Water | balance | | | | | |

Examples 22-29

Tumble dryer sheet product were prepared as follows. Arquad 2HT, Ceranine HC39 and DHTMAO were used as the active materials. The active materials were melted together and about 3g of the mix was blended with 10 ml of chloroform. The active was absorbed on an apertured non-woven polyester substrate of 11 cm x 9 cm ex J.R. Crompton plc, the substrate was subsequently dried.

In example 28 a commercially available tumble dryer product BOUNCE (Procter & Gamble) was used for comparison.

In example 29 no fabric conditioner was added to the tumble dryer.

A one metre length of terry towelling previously harshened by washing 8 times at 60° C in 24 FH water using a Miele front loading automatic, the cloths were line dried and 2 kg of ballast load were used in the tumble dryer. The dryer was operated for 90 min on high setting. The softener score was determined by using a panel, a higher score indicates a better softening.

| Example | Weight of active on sheet (g) | % active removed in drying | ratio AO:HC39:2HT | -score |
|---|---|---|---|---|
| 22 | 2.44 | 22 | 8 : 1 : 1 | 2.99 |
| 23 | 2.49 | 27 | 6 : 2 : 2 | 3.79 |
| 24 | 2.22 | 37 | 1 : 1 : 1 | 3.90 |
| 25 | 2.52 | 42 | 1 :4.5:4.5 | 4.13 |
| 26 | 2.41 | 34 | 1 : 1 : 8 | 5.19 |
| 27 | 2.40 | 47 | 4.5:4.5:1 | 4.21 |
| 28 | 2.10 | 77 | BOUNCE | 2.87 |
| 29 | - | - | - | 1.96 |

From this it follows that even though delivery of the active to the cloth was inferior for examples 22 - 27, all formulations were better than the BOUNCE sheets for softener preference.

Examples 30-37

Ternary active mixtures according to examples 22 - 29 were melted cooled and ground to obtain powdered softening compositions. The powders were introduced in an apertured cup comprising a bottom compartment such as disclosed in Fig. 1 of EP 204 484 (Unilever N.V.).

For comparison the actives were extracted from a BOUNCE sheet using chloroform, followed by drying and grinding.

Two grams of powdered material were added to the cup. The dryer conditions were as in examples 22 - 29. In example 37 no softener material was used for control purposes. The following results were obtained.

| Example | Ratio AO : HC39 : 2 HT | Softener score |
|---|---|---|
| 30 | 8 : 1 : 1 | 5.82 |
| 31 | 6 : 2 : 2 | 5.82 |
| 32 | 1 : 1 : 1 | 5.68 |
| 33 | 1 :4.5:4.5 | 6.18 |
| 34 | 1 : 1 : 8 | 7.71 |
| 35 | 4.5:4.5:1 | 4.40 |
| 36 | BOUNCE | 3.70 |
| 37 | Control | 1.85 |

## Claims

1. A fabric conditioning composition comprising
(i) a cationic fabric softening agent
(ii) an amine; and
(iii) an amphoteric fabric conditioning material.

2. A fabric conditioning composition according to claim 1, wherein the amphoteric fabric conditioning material is an amine oxide.

3. A fabric conditioning composition according to claim 1 or 2, being an aqueous liquid composition wherein based on the total weight of the three components (i) to (iii), the weight of (i) is at least 20%, the weight of (ii) is at least 5% and the weight of (iii) is at least 5%.

4. A fabric conditioning composition according to claims 2 and 3, comprising based on the total weight of the three components (i) to (iii),
(i) 40 - 60% of cationic softening agent

(ii) 15 - 40% of an amine
(iii) 15 - 40% of an amine oxide.

5. A fabric conditioning composition according to claims 1-4, comprising 3 - 30% by weight of active materials.

6. A fabric conditioning composition according to claim 1 or 2 being applied to a substrate.

7. A fabric conditioning composition according to claim 6 being applied to a flexible sheet substrate.

8. A fabric conditioning composition according to claim 1, in powdered form.

9. A fabric conditioning composition according to claim 6, 7 or 8 comprising
(i) 20 to 85% of cationic softening agent
(ii) 5 to 35% of an amine
(iii) 5 to 35% of an amine oxide.

10. Method for treating fabrics comprising the step of contacting fabrics with an aqueous bath comprising a fabric conditioning composition according to claims 1-4, the total concentration of the cationic fabric softening agent, the amine and the amine oxide being between 30 and 500 ppm.

11. Method for treating fabrics comprising the step of contacting fabrics in a tumble dryer with a substrate comprising 1-5 gr of a fabric conditioning composition according to claims 6, 7 or 9.

12. Method for treating fabrics comprising the step of contacting fabrics in a tumble dryer with a powdered fabric conditioning composition according to claim 8 or 9.