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(54) COMPOSITION D'ASSOUPLISSEUR DE TISSU

(54) FABRIC SOFTENING COMPOSITION

(57) A fabric softening composition comprising: (i) a quaternary ammonium material, which comprises a compound having two C_{12-28} alkyl or alkenyl groups, which are connected to the molecule via an ester link; and (ii) a C_{8-28} fatty acid material or salt thereof.

ABSTRACT

A fabric softening composition comprising:

(i) a quaternary ammonium material, which comprises a compound having two C_{12-28} alkyl or alkenyl groups, which are connected to the molecule via an ester link; and

(ii) a C_{8-28} fatty acid material or salt thereof.

FABRIC SOFTENING COMPOSITION

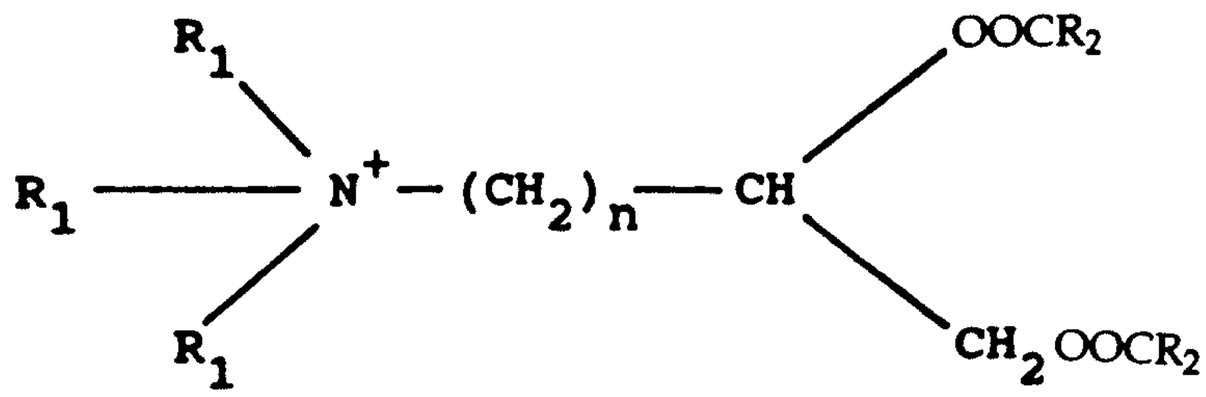
The present invention relates to a fabric softening composition and to a method for its preparation. Specifically, the present invention relates to a fabric softening composition for use in the rinse step of a fabric washing process.

It has been proposed in EP 239 910 (PROCTER & GAMBLE) to incorporate biodegradable quaternary ammonium compounds in fabric softening compositions. US 3 915 867 (STEPAN) discloses the use of N-methyl,N,N-di(β-C_{14-18} acyloxy ethyl) N- -hydroxy ethyl ammonium methosulphate in softening compositions.

It is an object of the present invention to provide fabric softening compositions which comprise biodegradable quaternary ammonium compounds. It is a second object of the invention to provide biodegradable fabric softening compositions which are of acceptable stability. Further objects of the invention are to provide fabric softening compositions which can easily be prepared and which provide surprisingly good softening to fabrics treated therewith.

Accordingly, the present invention relates to a fabric softening composition comprising:

(i) a quaternary ammonium material represented by the formula:



wherein each R_1 group is independently selected from C_{1-4} alkyl, alkenyl or hydroxyalkyl groups; and wherein each R_2 group is independently selected from C_{8-28} alkyl or alkenyl groups; and n is an integer from 0-5

(ii) a C_{8-28} fatty acid material or a salt thereof.

The compositions of the invention may take a variety of forms such as pastes, liquids, tablets, etc. and also they may be impregnated with substrates, for example for use in tumble dryers. Preferably, compositions of the invention are liquids comprising an aqueous base, wherein the active ingredients are dispersed.

Preferred quaternary ammonium materials and their methods of preparation are, for example, described in US 4 137 180 (LEVER BROTHERS). Preferably these materials comprise small amounts of the corresponding monoester as described in US 4 137 180 for example 1-tallowoxy, 2-hydroxy tyrimethyl ammonium propane chloride.

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Preferably, the level of ester-linked quaternary ammonium compounds is at least 1% by weight of the composition, more preferably more than 3% by weight of the composition; especially interesting are compositions of high active level, e.g. which comprise more than 8% of the ester-linked quaternary ammonium compound. The level of ester-linked quaternary ammonium compounds preferably is

* denotes trade mark

less than 70% by weight of the composition, more preferably less than 50%, typically from 3 to 30% by weight of the composition.

The fatty acid material or salt thereof can be any mono-, di- or tri-carboxylic acid comprising an alkyl or alkenyl chain having from 8 to 28 carbon atoms or salts thereof. Preferred fatty acid materials or their salts may be represented by the formula:

$$R_1COOR_2$$

wherein R_1 is a straight or branched alkyl or alkenyl chain having from 8 to 28 carbon atoms, and wherein R_2 is hydrogen or a cation. Preferred cations are alkali metal ions or alkali earth metal ions; more preferred are sodium, potassium or calcium.

Preferred is the use of a non-saponified fatty acid material. Especially preferred is the use of free fatty acids having a chain length of from 12 to 18, such as oleic acid, lauric acid, tallow fatty acid etc.

Preferably, the level of fatty acid material is more than 0.1% by weight of the composition, more preferably more than 0.2%; especially preferred are concentrated systems comprising more than 0.5% of fatty acid material. The level of fatty acid material will usually not exceed 50% by weight of the composition, more preferably the level of fatty acid material is less than 30%, typically from 0.5 to 10% by weight of the composition.

The weight ratio of ester-linked quaternary ammonium materials to fatty acid materials is preferably from 10:1

to 1:10, more preferably from 8:1 to 1:1, especially preferably from 7:1 to 3:1.

The compositions of the invention preferably have a pH of more than 2.0. For compositions containing free fatty acids, the pH is preferably less than 5.0 to prevent saponification of the fatty acids. For compositions containing the salts of the fatty acid, preferably the pH is 5.0 or more, more preferably between 5.0 and 8.0.

Compositions of the invention may, in addition to the above described two ingredients, also comprise other active ingredients such as further fabric conditioning materials.

In selecting the optional ingredients it is preferred to use materials which do not substantially affect the biodegradability of the composition. Therefore it is preferred to minimize the level of non-biodegradable or less bio-degradable materials.

Preferably, the compositions of the invention do not comprise large amounts of conventional non-ester-linked quaternary ammonium comounds, more preferably the compositions of the invention are substantially free of these quaternary ammonium compounds.

Suitable conditioning materials for inclusion in compositions of the invention comprise nonionic materials. Suitable nonionic fabric softening agents includ 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 Applications 88 520 (Unilever PLC/NV - Case C1325),

122 141 (Unilever PLC/NC - Case C1363) and 79 746 (Procter & Gamble).

Other softening materials which may be incorporated in a composition of the invention are amines, such as, for instance, described in EP 332270 published September 13, 1989, or biodegradable amphoteric softening materials such as, for instance, described in EP 326213, published August 2, 1989.

Preferably, the amount of softening materials other than the above mentioned ester-linked materials and fatty acid materials is relatively low, i.e. the weight ratio of other softener materials to the total of the two essential softener components is preferably less than 2:1, more preferably less than 1:1, most preferably less than 0.5:1.

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, e.g. HCl, H_2SO_4, phosphoric, benzoic or citric acids, rewetting agents, viscosity modifiers such as electrolytes, for example calcium chloride, anti-gelling agents, perfumes, perfume carriers, fluorescers, colourants, hydrotropes, anti-foaming agents, anti-redeposition agents, enzymes, optical brightening agents, opacifiers, stabilizers 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, anti-static agents and ironing aids.

These optional ingredients, if added, are preferably present at levels up to 5% by weight of the composition.

The liquid compositions according to the invention may be prepared by a variety of methods. One suitable method is to form a molten mixture of the ester-linked quaternary ammonium materials and the fatty acid materials, optionally in combination with other softening materials, and adding this premix to water with stirring to form a dispersion and thereafter adding any other 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 ester-linked quaternary ammonium compound and the fatty acid compound in this liquor will be between about 30 ppm and 1000 ppm. The weight ratio of the fabrics to the liquor will generally be between 1:1 and 1:20.

The invention will be further illustrated by the following Examples.

EXAMPLE I

The softening performance of compositions A-C was tested. Composition A is a commercially available fabric conditioner (KUSCHELWEICH) containing 4.5% by weight of dihardened tallow dimethyl ammonium chloride dispersed in water, pH 2.7. Composition B is a 5% by weight dispersion in water of Stepantex VRH 90; the pH of the product is 2.3. Composition C is a dispersion in water of 5% Stepantex VRH 90 and 0.83% of hardened tallow fatty acid; the pH of the product was 2.5.

2.5kg loads of desized terry towelling cloths were washed in an AEG *LAVAMAT 570 at 50°C with water of 24 FH and 100g of a commercially available washing powder (PERSIL AUTOMATIC). Compositions A-C were added to the last rinse cycle of the washing process in the amounts as indicated. The cloths were line-dried and assessed for softness by a trained panel of 9 persons by a round robin test method. A higher softness score indicates a better softness. The following results were obtained:

Relative Softness Scores on Terry Towelling

softening material	dosage *)		
	4	7	10
A	2.0	2.9	3.3
B	1.9	2.9	2.8
C	3.6	3.9	5.0

*) In grams of active material (cationic softener plus optionally fatty acid) per rinse.

These results show a clearly better softening performance for composition C compared to compositions A and B. This illustrates the surprisingly good performance of compositions comprising a combination of ester-linked quaternary ammonium compounds and fatty acid materials.

EXAMPLE 2

The softening performance of compositions DEF was tested. Composition D is a commercially available fabric conditioner (*COCCOLINO CONCENTRATE). The compositions were prepared by heating the active ingredients until molten and dispersing the molten active into demineralised water at 70°C whilst stirring.

*denotes trade mark

Component	wt%		
	D	E	F
DTTMAPC *	-	12.00	10.29
THTMAPC **	-	13.00	2.57
DHTDMAC ***	12.80	-	-
Hardened tallow fatty acid	3.20	-	2.14
Isopropylalcohol	2.13	2.70	2.27
Water	------- balance ---------		

* 1,2-ditallowoxytrimethyl ammonium propane chloride prepared according to US 4 137 180

** 1-tallowoxy, 2-hydroxy trimethyl ammonium propane chloride prepared according to US 4 137 180

*** dihardened tallow dimethyl ammonium chloride

40g loads of terry towelling test monitors were washed in a *MIELE front loading automatic with a ballast load of terry and polyester cotton to bring the total to 2.5kg. The load was washed with 100g of New System Persil Automatic at 60°C. 35ml of the compositions D, E or F was added during the final rinse. The monitors were line dried and assessed for softness using a round robin paired comparison protocol by an expert panel. A higher softness score indicates a better softness. The following results were obtained.

Composition	Softness Score
D	0.00
E	- 0.23
F	+ 1.00

*denotes trade mark

A difference between compositions of 0.89 was requried for a 95% significance.

These results show a better softening performance for composition F compared to compositions D and E. This illustrates the surprisingly good performance of compositions comprising a combination of ester-linked quaternary ammonium compounds and fatty acid materials.

EXAMPLE 3

The biodegradability of ester-linked quaternary ammonium materials was compared to that exhibited by more generally used quaternary ammonium materials such as dihardened tallow dimethyl ammonium chloride by using a modified STURM test as described in OECD Paris 1981 Test Guideline 301B, Decision of the Council C(81)30 Final, Consistent with the requirements of official Journal of the European Communities No. L251/179 C.5 BIODEGRADATION. Essentially the test measures the amount of carbon dioxide evolved from a sample undergoing biodegradation as a percentage of the theoretical maximum.

	% CO_2 evolved
DHTDMAC *	20%
Stepantex VRH 90	67.1 ± 8.7 (8 determinations)
DTTMAPC **	78.9 ± 10.1 (10 determinations)

* dihardened tallow dimethyl ammonium chloride

** 1,2-ditallowoxy trimethyl ammonium propane chloride

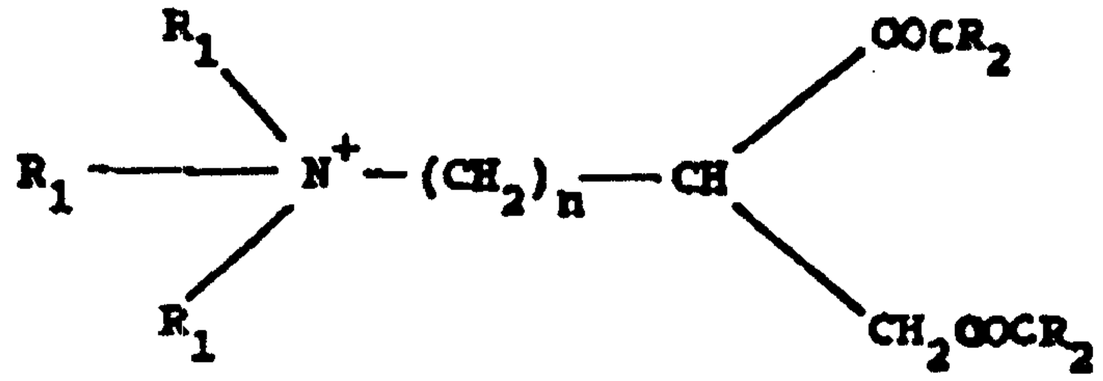
These results show that ester-linked quaternary ammonium materials suitable for use in compositions according to the invention are more biodegradable than

quaternary ammonium materials which are more generally used.

CLAIMS

1. A fabric softening composition comprising:

(i) a quaternary ammonium material having the formula:



wherein each R_1 group is independently selected from C_{1-4} alkyl, alkenyl or hydroxyalkyl groups; and each R_2 group is independently selected from C_{8-28} alkyl or alkenyl groups; and n is an integer from 0-5; and

(ii) a C_{8-28} fatty acid material or salt thereof.

2. A fabric softening composition according to claim 1, being a liquid and comprising an aqueous base.

3. A fabric softening composition according to claim 1 or claim 2, having a pH of from 2.0 to 5.0.

4. A fabric softening composition according to claim 1 or claim 2, wherein the fatty acid material is not saponified.

5. A fabric softening composition according to claim 1 or claim 2, wherein the weight ratio of the quaternary ammonium materials (i) to the fatty acid materials (ii) is from 10:1 to 1:10.

6. A fabric softening composition according to claim 1 or claim 2, wherein the quaternary ammonium material comprises 1,2-ditallowoxy trimethyl ammonium propane chloride.