

"FABRIC SOFTENER COMPOSITION"

The present invention relates to fabric softener compositions, especially adapted for use in the rinse cycle of a laundering process and, in particular, to concentrated and ready-for-use aqueous fabric

- 5. softener compositions which are stable at both low and high ambient temperatures, i.e. the compositions do not form a gel, and which are easily dispersible in water when used.

- 10. Compositions containing quaternary ammonium salts having at least one long chain hydrocarbyl group are commonly used to provide fabric softening benefits when employed in a laundry rinse operation; for example, see U.S. Patents 3,349,033; 3,644,203; 3,946,115; 3,997,453; 4,073,735; and 4,119,545.

- 15. For most aqueous softener compositions containing cationic quaternary ammonium compounds or imidazolium compounds as active ingredients, the concentrations of such cationics have, in general, been limited to the range of about 3 to 6 or 7% by weight
- 20. (see, e.g., U.S. Patent 3,904,533 and U.S. Patent 3,920,565). Such a low concentration is generally necessitated by the fact that cationics form gels in water systems at concentrations at above about 8%. While the use of electrolyte to lower the viscosity
- 25. of such compositions is known (see, e.g. U.S. Patent 4,119,545), such electrolytes are far from satisfactory. From a functional point of view, the electrolytes often do not perform as required, particularly at concentrations of the cationics in
- 30. the neighbourhood of about 12-15%. Further, while the performance of the electrolytes may mitigate some

of the gelling problem, their use is far from satisfactory in providing a highly concentrated aqueous system of cationics which does not gel or severely change in viscosity within the usual range of temperatures encountered in the handling thereof, for example 0°F (about -18°C) up to about 140°F (about 60°C).

- In U.S. patent 3,974,076, there is disclosed quaternary ammonium-containing softening compositions of conventional cationic concentrations, i.e. about 3% to about 8%. These compositions are characterised by the very small particle size of the substantially water-insoluble quaternary ammonium softening compound i.e. 90% by weight of the quaternary ammonium compound exists as particles which pass through a 1.2 micron filter. The components of the composition are present in the proportions of from about 2 parts to about 10 parts (preferably from about 3 to about 8 parts) by weight of the water dispersible quaternary ammonium compound; from about 0.1 to 2 parts by weight of the C₈ to C₂₀ fatty alcohol, with the weight ratio of quaternary compound to alcohol being in the range of from about 100:1 to about 5:1, from about 0.1% to about 2.0% by weight of a nonionic surfactant, the balance being a water-soluble liquid carrier.

In fact, the use of fatty alcohols as softening ingredients or as viscosity regulating agents in fabric softening compositions has been described elsewhere in the patent literature. For example, U.S. patent 4,213,867 to Cukier and Khan describes

5. fabric conditioning compositions containing quaternary ammonium compounds and fatty alcohols or phosphoric acid esters thereof in admixture with a diluent; the compositions are pumpable at room temperature and are easily dispersed in water. These compositions are highly concentrated base mixes for subsequent dilution prior to distribution and use. The compositions generally contain between about 50 and 80% of quaternary ammonium compound, a diluent
10. (C_1 to C_4 alkanol plus water) constituting between about 15 and 35% of the base mix and a third component in an amount of from about 5 to 25% which is a C_{18} to C_{28} fatty alcohol or a phosphoric acid ester thereof or mixtures thereof. The base mix is
15. diluted with water to form an aqueous emulsion of 2-10% concentration based on the combined active ingredients, i.e. quaternary ammonium compound and fatty alcohol or phosphate ester.
20. U.S. Patent 4,386,000 to Turner, et al describes a concentrated fabric softening composition containing a cationic softener and a viscosity control agent which is a combination of a first component, which is a noncyclic hydrocarbon, fatty acid, fatty acid ester, or fatty alcohol, with a
25. water-soluble cationic polymer having an average molecular weight in the range of from about 2,000 to 250,000. The water-insoluble cationic fabric softener is present in the composition in an amount of from 8% to 22% and the viscosity regulator system
30. includes from about 0.5 to 6% of the first regulator

component and from about 0.05 to about 1% of the water-soluble cationic polymer as the second regulator component.

- The Turner, et al patent is stated to be an
5. improvement over the Verbruggen European patent Application 79200801.3 corresponding to Verbruggen U.S. Patent 4,426,299. The Verbruggen patent discloses concentrated fabric softening compositions comprising water-insoluble cationic fabric softener
 10. and a viscosity control agent which may be a noncyclic hydrocarbon, a fatty acid, or ester thereof, or a fatty alcohol at a ratio of fabric softener to viscosity control agent of from 5:1 to 20:1. According to Turner, et al, these compositions
 15. are less effective as viscosity reducing agents and concentrated compositions at temperatures close to or above the Krafft point of the cationic softener.

- European Patent Application 0086105 describes fabric softening compositions containing a cationic
20. softener, lanolin and a viscosity control agent which may be an electrolyte, a polymer such as polyethylene glycol, a C₁₂-C₄₀ hydrocarbon and halogen derivatives thereof, C₉-C₂₄ fatty acids, fatty acid esters thereof, C₁₀-C₁₈ fatty alcohols or water miscible
 25. solvents. The cationic softener is present in amount of 0.5 to 30% by weight, the lanolin in amounts of from 0.25 to 40% by weight, and, when the viscosity control agent is the fatty alcohol, it is present in amounts of 0.25 to 15% by weight. The aqueous medium
 30. comprises at least 25% of the composition and preferably at least 40% of the composition. However,

none of the actual examples shown in this patent include fatty alcohol viscosity adjusting agent.

United Kingdom Patent Application 2,007,734A describes a fabric softener concentrate for

5. subsequent dilution to the final concentration of active ingredients. The concentrate contains a fatty quaternary ammonium salt which contains at least one long chain alkyl group of 8 to 30 carbon atoms, and an oil or substantially water-insoluble compound
10. having oily/fatty properties. The latter includes, among others, long chain fatty alcohols. Proportions of quaternary fabric softener to fatty alcohol compound of 1:9, 1:5, 4:6, 9:10 or 9:1 by weight are shown, generally with a lower alkanol alone or with
15. an additional nonionic surfactant to provide liquid concentrate or diluted composition. The fabric softening compositions, i.e. the concentrates diluted with water, are described as including from 3 to 20% by weight of active ingredients. However, the
20. actual examples only show amounts of active ingredients ranging from about 2.33 to 10% by weight.

French Patent 2,298,600 and corresponding German patent 2,503,026 to Hoechst AG describe liquid aqueous preparations for laundry softening-rinsing

25. agents, which include a germicidal agent. These preparations include a mixture of a quaternary ammonium salt cationic fabric softener and an alkyl imidazolinium compound fabric softener compound at a weight ratio of 2:1 to 1:2, about 1 to 6% by weight
30. of a cationic disinfecting agent; about 0.5 to 5% by

- weight of a long chain fatty alcohol; about 0.1 to 5% by weight of a lower alkanol having about 1 to 3 carbon atoms; 0 to about 5% by weight of a nonionic emulsifier and the balance water, perfume, colouring matter and optical brighteners.
- 5.

- German DE 3,150,179-A1 to Hoechst A.G. relates to concentrated liquid premixtures of cationic fabric softeners with alkoxyated amines and an additional ingredient which may be a fatty alcohol. Example 3 of this patent shows a concentrate containing 40% of the cationic fabric softener, 45% oleyl alcohol and 15% alkoxyated amine. Example 5 shows a concentrate including 70% by weight of the cationic quaternary ammonium salt fabric softener, 20% isostearyl alcohol and 10% alkoxyated amine.
- 10.
- 15.

- U.S. Patent 3,644,203 to Lamberti, et al discloses a fabric softening composition which is a mixture of a (a) cationic fabric softener and (b) a complex of (i) C₁₂ to C₂₂ fatty alkanol or alkane diol and (ii) alkali metal alkyl (C₁₂ to C₁₈) sulphate at a ratio of (a):(b) between 1.4:1 and 10:1 and a molar ratio (i):(ii) between 1:1 and 1:2.
- 20.

- While satisfactory results may be obtained with one or more of these prior art fabric softener compositions still further improvements are desired in terms of softening performance, ease of handling, storage stability, dispersibility in cold water, and overall cost effectiveness. In addition, it is desirable to provide improved fabric softening compositions which do not require or include such
- 25.
- 30.

additional non-softening components as are present in many of these prior art formulations, such as nonionic surfactant, lower alcohol cosolvents, and cationic polymers.

The present invention provides low and high temperature stable, aqueous softener compositions based upon cationic fabric softening compounds and a minor amount of a fatty alcohol having an alkyl group of from about 10 to about 24 carbon atoms. A minor amount of _____ an ethoxylated amine can be present as optional ingredient.

More particularly, the present invention provides stable, aqueous, cold and warm water dispersible fabric softener compositions which consist essentially of

(A) 3 to 20% by combined weight of (i) a cationic fabric softener and (ii) a fatty alcohol having an alkyl group with from 10 to 24 carbon atoms at a weight ratio of (i):(ii) of from 4.5:1 to 3.5:1;

(B) 0 to 2% by weight of an ethoxylated amine emulsifier;

(C) Optionally up to 0.9% by weight of perfume,

(D) One or more optional additives selected from the group consisting of dyes, colourants, pigments, opacifiers, germicides, disinfectants, optical brighteners, anticorrosion agents, and preservatives, the amount of any such additives being up to 0.5% by weight, the composition being free of organic solvent (E) or if present, the amount of any organic solvent (E) being not in excess of 3.5% by weight, balance to 100% water, the composition being free of water soluble electrolyte.

The compositions of the present invention are stable aqueous compositions which contain as the active fabric softening components synergistic

- mixtures of a cationic fabric softener which is preferably a water-dispersible quaternary ammonium compound salt or a water dispersible alkyl imidazolinium compound salt or a water dispersible alkyl imidazolinium compound salt as hereinafter described in more detail, and a fatty alcohol, also as hereinafter described.
- 5.

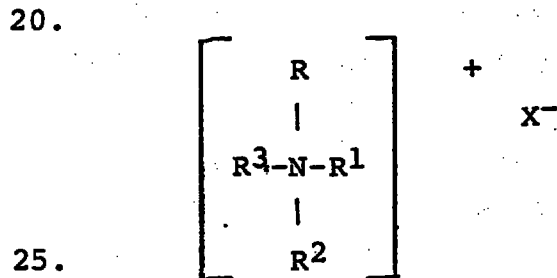
- The aqueous compositions of the present invention contain as the first active fabric softening component at least one cationic fabric softener in an amount generally ranging from about 74 to 86% by weight, preferably from about 75 to 85% by weight of the total active fabric softening components (cationic fabric softener plus fatty alcohol), or on the basis of the total aqueous composition, the amount will be: for a concentrated formulation, from about 8.8 to 15% by weight, preferably from about 10 to 13%, by weight and for a ready-to-use formulation from about 2.2 to 7%, preferably from about 2.3 to 6.6%, by weight.
- 10.
- 15.
- 20.

- It is understood, of course, that a ready-to-use product is one for which the consumer is instructed to use the product at full strength (i.e. without further dilution - except, of course, for the rinse water, etc.) at the specified dosage level, e.g. 1/4 to 1/2 cup per load of wash (usually about 6 to 15 pounds). On the other hand, a concentrated formula is one for which the consumer is instructed to dilute the product (e.g. from about 1 to 4X) to make up the required dosage, e.g. 1/4 to 1/2 cup per load of wash.
- 25.
- 30.

Accordingly, it is clear that for the preferred concentrated formula, the consumer will have at least the perceived notion of greater economy and flexibility in use.

5. Softening agents are used to render fabrics or textiles soft, and the terms "softening" and "softener" refer to the handle, hand, touch, or feel; this is the tactile impression given by fabrics or textiles to the hand or body and is of aesthetic and commercial importance. The cationic fabric softeners used in the present invention can be any of the commercially available and known cationic fabric softeners and preferably are of the water-dispersible quaternary ammonium compound salt or alkyl imidazol-
10. inium compound salt type including at least one, and preferably two hydrophobic groups containing at least 12 and preferably at least 14 carbon atoms.

One preferred class of the cationic softeners are the quaternary ammonium salts of the formula I:



- wherein R represents a hydrocarbyl group of from about 12 to 24 and preferably about 14 to 22 carbon atoms; R¹ represents a lower alkyl group of 1 to 4, preferably 1 to 3, carbon atoms, or a hydrocarbyl
- 30.

group of from 12 to 24, preferably 14 to 22, carbon atoms; R^2 and R^3 each represent a lower alkyl group of 1 to 4, preferably 1 to 3, carbon atoms, and each of R , R^1 , R^2 and R^3 may be unsubstituted or substituted, and X represents an anion capable of imparting water solubility or dispersibility such as halide, e.g. chloride, bromide and iodide; sulphate; methosulphate, nitrite, nitrate, phosphate, and carboxylate, e.g. acetate, adipate, propionate, phthalate, benzoate or oleate.

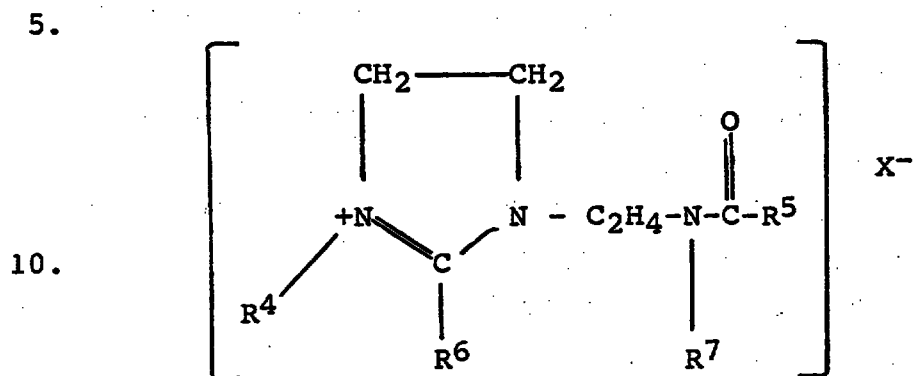
The hydrocarbyl groups are preferably alkyl but may be alkenyl, aryl, or aralkyl and may include various substituents or interrupting groups such as halo, amide, hydroxyl, and carboxyl substituents or interrupting functional groups and ethoxy or polyethoxy interrupting groups. In addition, one or more of the lower alkyl groups may also be substituted, for example, by an hydroxy group. Typical cationic fabric softener compounds of formula I include the following:

- distearyl dimethyl ammonium chloride;
- ditallow dimethyl ammonium chloride;
- dihexadecyl dimethyl ammonium chloride;
- distearyl dimethyl ammonium bromide;
- di(hydrogenated tallow) dimethyl ammoniumbromide;
- distearyl di(isopropyl) ammonium chloride;
- distearyl dimethyl ammonium methosulphate.

A highly preferred class of the cationic fabric softeners of formula I are the water-insoluble compounds wherein the groups R and R^1 are C_{14} to C_{18} , R^2 is methyl or ethyl and R^3 is methyl, ethyl,

isopropyl, n-propyl, hydroxyethyl or hydroxypropyl.

A second preferred class of the cationic fabric softener active ingredient are the imidazolinium compounds of the formula II;



- wherein R^4 represents a hydrogen atom or a lower alkyl group of 1 to 4 and preferably 1 to 3 and especially preferably 1 or 2 carbon atoms, R^5 represents an alkyl group containing from 9 to 25 carbon atoms, preferably a linear higher alkyl group of from about 13 to 23 and especially preferably 13 to 19 carbon atoms, R^6 represents an alkyl group containing from 8 to 25 carbon atoms and preferably a substantially linear higher alkyl group of about 13 to 23, and preferably 13 to 19 carbon atoms; R^7 represents a hydrogen atom or an alkyl group containing from 1 to 4 carbon atoms, preferably 1 or 2 carbon atoms, and X is as defined above.

Typical examples of the alkyl imidazolinium compounds of formula II include:

30. methyl-1-tallow amido-ethyl-2-tallow imidazolinium methyl sulphate,

and methyl-1-oleyl amido-ethyl-2-oleyl imidazolinium methyl sulphate.

Other imidazolinium quaternary compounds which can be used are:

1-methyl-1-(palmitoylamido)-ethyl-2-octadecyl-imidazolinium chloride,

2-heptadecyl-1-methyl-1-(2-stearylamo)-ethyl-imidazolinium chloride,

2-lauryl-1-hydroxyethyl-1-oleyl-imidazolinium chloride.

The water dispersible cationic fabric softeners which can be used in the compositions of the present invention are not limited to those described above and any of the other known useful water dispersible cationic fabric softeners can be used. Furthermore, mixtures of the above mentioned cationic fabric softeners can also be used.

The second essential fabric softening ingredient is the fatty alcohol wherein the hydrophobic group may be a straight or branched chain alkyl or alkenyl group having from about 10 to 24, preferably from about 10 to 20, especially preferably from about 12 to 20 carbon atoms. Specific examples of the fatty alcohol include decanol, dodecanol, tetradecanol, pentadecanol, hexadecanol, octadecanol, lauryl alcohol, palmityl alcohol, stearyl alcohol, oleyl alcohol, and mixtures thereof. Furthermore, the fatty alcohol may be of natural or synthetic origin and may include, for example, mixed alcohol, such as C₁₆ to C₁₈ alcohols prepared by Ziegler polymerization of ethylene.

The fatty alcohol is present in the composition

in a minor amount relative to the cationic fabric softener such that the ratio, by weight, of the cationic fabric softener to fatty alcohol is in the range of from 4.5:1 to 3.5:1. Within these proportions, the fatty alcohol is present in the formulation, based on the total weight of the aqueous composition, in the range of from about 1.4 to 5% by weight, preferably about 2.0 to 4% by weight, for the concentrated formulation, and in the range of from about 0.4 to 2%, preferably from about 0.1 to 1.4%, by weight for the ready-to-use formulation.

The total amount of the active fabric softening components (cationic fabric softener plus fatty alcohol) is at least 11% by weight, preferably at least 12% by weight, more preferably about 12 to 20% by weight, especially preferably 12 to 16% by weight, for the concentrated formulation. Within these high concentrations of the fabric softening components, highly stable and pourable compositions can be obtained which do not gel upon addition to cold or warm water. Furthermore, in view of the high total amounts of the active fabric softening components, the consumer is provided with a wide choice of suitable dosages which can still provide effective softening over wide ranges of fabric loads. Generally, however, it is sufficient to provide the compositions of the present invention in amounts which provide a concentration in the range of from

about 10 ppm to 1,000 ppm, preferably from about 50 ppm to about 500 ppm, of total active ingredients when added to the rinse liquor of a washing cycle. Accordingly, the formulations should be diluted prior to use in an amount depending on the starting concentration and desired level of performance, from about 1 to 4 times, preferably 2 to 3 times with water. Tap water is sufficient for this purpose. For the ready-to-use formula, which can be added directly to the fabrics, generally during the rinse cycle of the overall washing operation in an automatic washing machine, the total amount of active softening ingredients will be from about 3 to 8%, preferably from about 3.5 to 6% by weight, based on the total composition.

In view of the synergistic interaction between the two active softening components, formulations can be used with reduced total levels of active ingredients while maintaining the softening efficiency equivalent to the present best commercially available softening system.

It is one of the outstanding advantages of the present invention that it is not necessary to include any additional ingredients such as nonionic surfactant emulsifiers, lower alkanols, etc. to formulate stable homogeneous low viscosity pourable compositions from the mixed cationic fabric softener and fatty alcohol. However, it is often desirable to include an ethoxylated

amine to further increase the stability against separation of the suspended phase of the formulation.

The ethoxylated amine compounds contemplated herein as emulsifiers are based upon ethoxylated long chain amines and the inorganic acid and organic acid salts thereof. The amines are typically C₁₂ to C₃₀ aliphatic amines, and preferably C₁₂ to C₂₀ amines and admixtures thereof reacted with from one to about 100 moles of ethylene oxide. The amines may also be reacted with propylene or butylene oxide and then with ethylene oxide. The final oxyalkylated amine should be a water-soluble product. Of particular

- value are the amines derived from natural fatty acids, such as the Armeens and Ethomeens and these generally comprise a mixed alkyl ranging from C₁₀ to C₁₈, or C₁₂ to C₁₆, or C₁₂ to C₁₅, or C₁₆ to C₁₈, and
5. the like. Preferred ethoxylated amines are those containing from about 5 to about 50 moles of condensed ethylene oxides and more preferred are ethoxylated amines with about 10 to about 35 moles condensed ethylene oxide. Most preferred contain 12
 10. to 20 moles of ethylene oxide.

- Any of the common inorganic acids can conveniently be used to form the neutral salts of the ethoxylated amine compounds. Suitable inorganic acids include, for example, HCl, HNO₃, H₂SO₄, and
15. H₃PO₄. Similarly, the organic acids used to form the amine salts are not particularly restricted. Thus, such short chain aliphatic monocarboxylic organic acids as acetic acid, propionic acid, butyric acid and acrylic acid; aromatic acids, such as benzoic
 20. acid, naphthoic acid, and toluic acid; long chain aliphatic monocarboxylic acids, such as lauric, dodecanoic, myristic, tetradecanoic, pentadecanoic, palmitic; hexadecanoic, heptadecanoic, stearic, oleic, linoleic, linolenic, eleostearic, ricinoleic,
 25. dihydroxystearic, nonadecanoic, eicosanoic, and arachidonic, can all be used in this invention. The use of the ethoxylated long chain amine salts with long chain organic acids to provide stable concentrated aqueous fabric softening compositions is
 30. disclosed in applicants' copending U.S. Application

Serial No. 493,450, filed 11th May, 1983,
corresponding to G.B. Application No. 8411919, Serial
No. 2139658.

The amine compound emulsifiers may be added in amounts effective to increase stability of the formulation while at the same time providing some softening action. Suitable amounts are generally up to about 3%, preferably 0.1 to 3%, e.g. 0.1 to 2%, for example 0.5 to 2%, based on the total weight of the composition.

In addition to the ethoxylated amine compounds mentioned above, any of the water-soluble ethoxylated amine compounds disclosed in U.K. Patent Application GB 2,133,415A, published 25th July, 1984, especially the ethoxylated monoamines can be used for their emulsifying properties. The optional additives, if present, are preferably each present in an amount of no more than 0.2%, for example from 0.001% to about 0.1% by weight of the aqueous composition. The use of perfumes, dyes and optical

brighteners are especially preferred additives in terms of consumer appeal.

As used in the claims appended hereto, the term "consisting essentially of" is intended to restrict the scope of the present invention to only the named ingredients and minor amounts of such additional components which may enter into the compositions of the present invention by virtue of being present in one or the other of the raw ingredients or any additional ingredients which do not have a material effect on the basic properties, i.e. softening performance, of the present invention. Thus, it is generally recognized that many of the commercially available cationic fabric softeners are provided as, for example, a 75% solution in, for example, isopropyl alcohol. Thus, such minor amounts of isopropyl alcohol or other solvent materials may also be present in the compositions of the present invention, provided that the amount of any such organic solvent is not in excess of 3.5% by weight. However, in the present invention, no additional amounts of organic cosolvents such as the lower alkanols, which are often added to the prior art fabric softening compositions as viscosity adjusting agents, are necessary or required and their use should be avoided.

Preferably any organic cosolvents such as lower alkanols present are present in an amount of no more than 3% by weight of the total composition, desirably no more than 2% and particularly no more than 1%. It is most desirable that the compositions be free or substantially free of C₁₋₄ alkanols.

The balance of the compositions of the present invention is provided by water which may be distilled, deionized or tap water.

- As noted above, it is generally not required to
5. add any additional ingredients to the active fabric softening components in order to provide the homogeneous stable low viscosity pourable and dispersible fabric softening compositions of the present invention.
10. For example, in the case of one preferred embodiment of the invention wherein the cationic fabric softener is distearyl dimethyl ammonium chloride (DSDMAC) and wherein the fatty alcohol is a C₁₆-C₁₈ alkyl alcohol, the composition is prepared directly
15. using a high pressure homogenizer. Thus, a mixture of DSDMAC and the C₁₆-C₁₈ alcohol when dispersed in hot water forms a gel which can be broken in a high pressure homogenizer resulting, after cooling, in a stable liquid product.
20. The invention may be put into practice in various ways and a number of specific embodiments will be described to illustrate the invention with reference to the accompanying examples. Parts are by weight unless otherwise indicated.
25. EXAMPLES 1A to 1G
- These examples show the preparation of stable liquid flowable low viscosity concentrated formulations using a high pressure homogenizer. The formulations given in Tables 1A and 1B below are
30. prepared.

TABLE 1A

<u>Example</u>		<u>1A</u>	<u>1B</u>	<u>1C</u>	<u>1D</u>
<u>Ingredient</u>					
5.	Distearyl dimethyl ammonium chloride (DSDMAC)	12.60	12.00	11.44	10.50
	C ₁₆ -C ₁₈ fatty alcohol (FA)	1.40	2.00	2.56	3.50
	Perfume	0.90	0.90	0.90	0.90
10.	Colour material (0.2% solution)	1.20	1.20	1.20	1.20
	Water	q.s. to 100			
	Ratio DSDMAC:FA	9:1	6:1	4.5:1	3:1

TABLE 1B

<u>Example</u>		<u>1E</u>	<u>1F</u>	<u>1G</u>
<u>Ingredient</u>				
15.	Distearyl dimethyl ammonium chloride (DSDMAC)	9.66	8.40	7.42
20.	C ₁₆ -C ₁₈ fatty alcohol (FA)	4.34	5.60	6.54
	Perfume	0.90	0.90	0.90
	Colour material (0.2% solution)	1.20	1.20	1.20
25.	Water	q.s. to 100		
	Ratio DSDMAC:FA	2.2:1	1.5:1	1.2:1

The formulations are prepared as follows:

30. 1. The mixture of distearyl dimethyl ammonium chloride and fatty alcohol are heated up to 65°C.

2. The colouring material solution is added to the water preheated up to 65°C.

3. The perfume is added to the active ingredient mixture.

5. 4. The premix made in step (3) is quickly added to the water under high efficient stirring. A gel forms.

10. 5. The gel is introduced into a high pressure homogenizer with the pressure adjusted to 700 atmospheres.

6. The product is quickly cooled to room temperature using an ice bath under slow stirring.

15. The softening performance of each of the compositions of Examples 1A to 1F are compared. The comparisons of softening performance are made by an evaluation by six judges under the following conditions: laboratory treatment of 6 times hardened cotton terrycloth towels at a dosage of 20 ml per wash (0.112 gram active ingredients: cationic softener plus fatty alcohol per litre). Five replicates are made for each composition. The results in terms of mean scores (on a scale of -3 to +3) based on the averages for the six judges - five replicates are given in Table 2 below:

25.

TABLE 2

Cationic Softener/Alcohol

Composition	Weight Ratio	Mean Score
1A	9:1	0.131
1B	6:1	0.374
30. 1C	4.5:1	0.240
1E	2.2:1	0.140
1F	1.5:1	-0.080
1G	1.2:1	-0.673

The best performances are provided by the 6:1 and 4.5:1 ratios.

EXAMPLES 2A, 2B and 2C

- This example shows the synergistic interaction between the cationic fabric softener and the fatty alcohol in increasing the softening performance of the composition. The softening performance is determined for the composition (quat/fatty alcohol = 4.5:1) of Example 1C at 3 different levels of active ingredients (i.e. quat + fatty alcohol) given in Table 3 below:

TABLE 3

<u>Example</u>	
2A	0.22 gram active ingredients per litre;
15. 2B	0.18 gram active ingredients per litre; and
2C	0.13 gram active ingredients per litre.

- The results are evaluated in comparison to a conventional fabric softening composition (Example 2D) containing 5% of dimethyl distearyl ammonium chloride without any fatty alcohol at the same total active ingredients concentrations. The comparisons of softening performance are made by an evaluation of six judges under the following conditions: laboratory treatment of 6 times hardened cotton terrycloth towels at a dosage of the composition sufficient to provide each of the three different total levels of active ingredients. Five replicates are made for each formula at each weight level.
30. The results given in Table 4 below are obtained

with the mean scores for each formulation being based on a comparison with each of the other formulations on a scale ranging from -3 to +3 with the higher values indicating better performance:

5.

TABLE 4

		Mean value softening	
<u>Example</u>		<u>Composition</u>	<u>performance</u>
	2A	DSDMAC/alcohol 0.22 gram AI/1	+0.7
10.	2B	DSDMAC/alcohol 0.18 gram AI/1	-0.1
	2C	DSDMAC/alcohol 0.13 gram AI/1	-0.7
	2D	5% DSDMAC 0.22 gram AI/1	+0.2
15.			

From the above results, it can be seen that the mixture of 0.18 grams of DSDMAC plus 0.04 grams of fatty alcohol (Example 2A) provides better softness than 0.22 grams of DSDMAC alone. Furthermore, the mixture of 0.147 grams of DSDMAC and 0.032 grams of fatty alcohol (Example 2B) provides almost equal softness to 0.22 gram of DSDMAC alone.

20.

EXAMPLES 3A to 3H

25.

These examples compare the stability of softening compositions at different weight ratios of cationic fabric softener to fatty alcohol in a 12% aqueous dispersion; the results being given in Table 5 below:

30.

TABLE 5

Ex.	DSDMAC/C ₁₆ -C ₁₈ (weight ratio)	Active Ingredient (weight ratio for 12% AI formula)	Stability on Ageing Viscosity (cps)	
			Start	After 6 weeks
5.				
	3A	8.78:1	10.77:1.23	46 56
	3B	5.85:1	10.25:1.75	32 32
	3C	4.40:1	9.77:2.23	34 36
	3D	2.93:1	8.94:3.06	44 164
10.	3E	2.19:1	8.24:3.76	52 208
	3F	1.76:1	7.65:4.35	37600 Gel
	3G	1.46:1	7.13:4.87	Gel -
	3H	1.10:1	6.28:5.72	Gel -

15. From these results, it can be seen that the formulations providing the best stability on ageing are the 5.85:1 and 4.4:1 cationic softener:fatty alcohol weight ratios (Examples 3B and 3C respectively). At these ratios very stable, low viscosity formulations are achieved.

20. Furthermore, in consideration of the overall softening performance as shown in Examples 1A to 1G and the stability (viscosity) performance as shown in Examples 3A to 3H, it can be appreciated that the
25. best results are provided at weight ratios of cationic fabric softener:fatty alcohol in the range of about 6:1 to 2.8:1 or 3:1, especially 6:1 to 4:1.

EXAMPLES 4 to 10

30. When the procedure of Example 1 is repeated for the compositions of Example 1B, 1C and 1D but

replacing DSDMAC with ditallow dimethyl ammonium chloride (Examples 4A to 4C), dihexadecyl dimethyl ammonium chloride (Examples 5A to 5C), methyl-1-tallow-amidoethyl-2-tallow imidazolinium methyl

5. sulphate (Examples 6A to 6C) or 2-lauryl-1-hydroxyethyl-1-oleyl-imidazolinium chloride (Examples 7A to 7C), substantially the same results are obtained.

10. Similarly, when dodecanol (Examples 8A to 8C), stearyl alcohol (Examples 9A to 9C) or palmityl alcohol (Examples 10A to 10C), are used in place of the mixed C₁₆ to C₁₈ alcohol in the compositions of Examples 1B, 1C and 1D, substantially the same softening performance and stability are obtained.

EXAMPLE 11

15. The ready-to-use composition given in Table 6 is prepared by mixing the following ingredients:

TABLE 6

	<u>% by weight</u>
dimethyl distearyl ammonium chloride	3.2
20. C ₁₆ -C ₁₈ fatty alcohol	0.8
Water	96.0

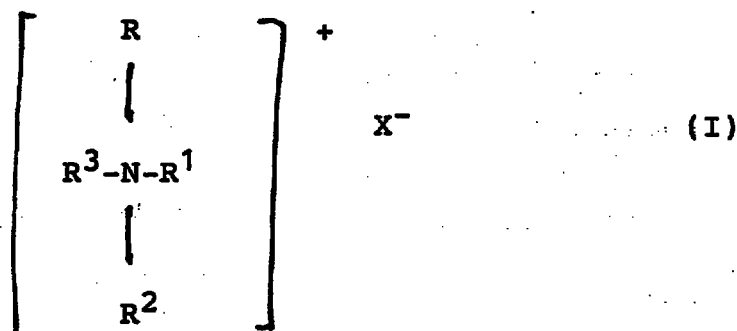
EXAMPLE 12A to 12C

25. Example 11 is repeated except that in place of a like amount of water, 0.5% by weight of Ethomeen T25 [tallow amine (40% C₁₆, 60% C₁₈) condensed with 15 moles ethylene oxide] is used. Similar results are achieved when the HCl (Example 12B) or acetic acid (Example 12C) salts of Ethomeen T25 is used in the
30. same amount.

Our copending application no. 8602317 Serial no. 2170829 describes and claims a

stable, aqueous, pourable and water dispersible fabric softener composition comprising

(A) 4 to 20% by combined weight of (i) a cationic fabric softener and (ii) a fatty alcohol having from 10 to 24 carbon atoms at a weight ratio of (i):(ii) of from 6:1 to 3.5:1, the cationic fabric softener being a quaternary ammonium salt of formula I,:



where R represents a hydrocarbyl group of from about 12 to 24 carbon atoms;

R¹ represents a lower alkyl group of from 1 to 4 carbon atoms or a hydrocarbyl group of from 12 to 24 carbon atoms;

R² represents a lower alkyl group of 1 to 4 carbon atoms;

R³ represents a lower alkyl group of 1 to 4 carbon atoms; and each of R, R¹, R² and R³ may be unsubstituted or substituted, and

X represents a salt-forming anion;

(B) 0 to 1.5% by weight of a water soluble electrolyte,

(C) 0 to 3% by weight of an ethoxylated amine emulsifier,

(D) optionally up to 0.9% by weight of perfume;

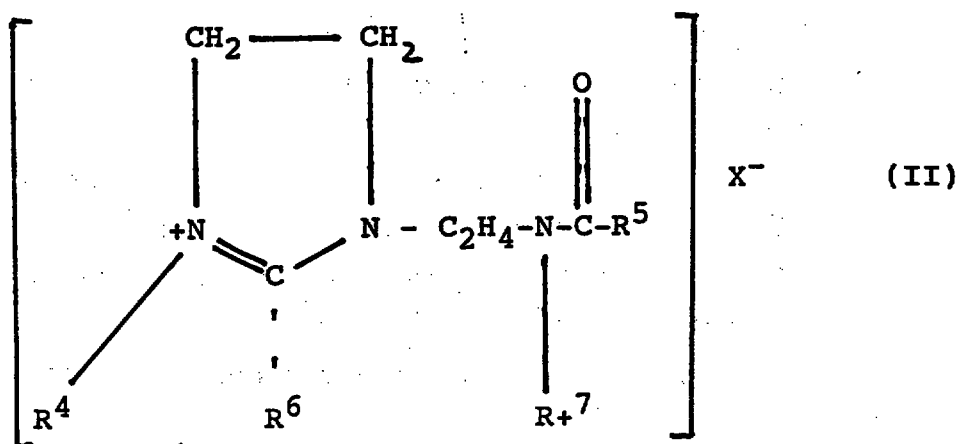
(E) one or more optional additives selected from the group consisting of dyes, colourants, pigments, opacifiers, germicides, disinfectants, optical brighteners, anti-corrosion agents, and preservatives, the amount of each of any such additives being up to 0.5% by weight, the composition being free of organic solvent (F), or if present, the amount of any organic solvent (F) being not in excess of 3.5% by weight, balance to 100% of water.

We make no claim herein to such a composition.

Our copending application no. 8817217 Serial no. 2207154 describes and claims a stable, aqueous, pourable and water dispersible fabric softener composition comprising

(A) 3 to 20% by combined weight of (i) a cationic fabric softener and (ii) a fatty alcohol having from 10 to 24 carbon atoms at a weight ratio of (i):(ii) of from 4.5:1 to 2.8:1,

the cationic fabric softener being an alkyl-imidazolinium salt of formula II:



where R^4 represents a hydrogen atom or a lower alkyl group of 1 to 4 carbon atoms;

R^5 represents an alkyl group of from 9 to 25 carbon atoms;

R⁶ represents an alkyl group of from 8 to 25 carbon atoms;

R⁷ represents a hydrogen atom or an alkyl group of 1 to 4 carbon atoms; and

X represents a salt-forming anion, or

1-methyl-1-(palmitoylamido)-ethyl-2-octadecyl-imidazolinium chloride, or

2-heptadecyl-1-methyl-1-(2-stearylamido)-ethyl-imidazolinium chloride, or

2-lauryl-1-hydroxyethyl-1-oleyl-imidazolinium chloride;

(B) 0 to 1.5% by weight of a water soluble electrolyte,

(C) 0 to 3% by weight of an ethoxylated amine emulsifier,

(D) optionally up to 0.9% by weight of perfume;

(E) one or more optional additives selected from the group consisting of dyes, colourants, pigments, opacifiers, germicides, disinfectants, optical brighteners, anti-corrosion agents, and preservatives, the amount of each of any such additives being up to 0.5% by weight, and

the composition being free of organic solvent (F), or if present, the amount of any organic solvent (F) being not in excess of 3.5% by weight, balance to 100% of water.

We make no claim herein to such a composition.



CLAIMS

1. A stable, aqueous, pourable and water dispersible fabric softener composition comprising

(A) 3 to 20% by combined weight of (i) a cationic fabric softener and (ii) a fatty alcohol having from 10 to 24 carbon atoms at a weight ratio of (i):(ii) of from 4.5:1 to 3.5:1,

(B) 0 to 3% by weight of an ethoxylated amine emulsifier,

(C) Optionally up to 0.9% by weight of perfume,

(D) One or more optional additives selected from the group consisting of dyes, colourants, pigments, opacifiers, germicides, disinfectants, optical brighteners, anticorrosion agents, and preservatives, the amount of each of any such additives being up to 0.5% by weight, the composition being free of organic solvent (E) or if present, the amount of any organic solvent (E) being not in excess of 3.5% by weight, balance to 100% of water, the composition being free of water soluble electrolyte.

2. A composition as claimed in Claim 1 consisting essentially of A,B,C,D and water.

3. A composition as claimed in Claim 1 consisting essentially of A,C,D and water.

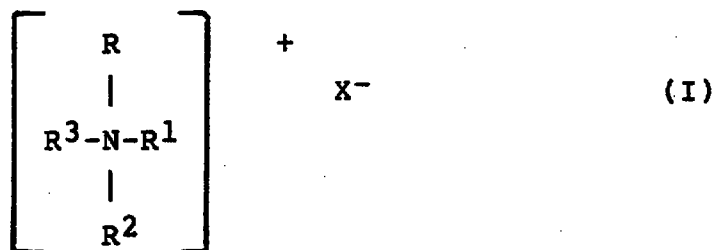
4. A composition as claimed in any one of Claims 1 to 3 in which the weight ratio of (i) : (ii) is from 6:1 to 3:1.



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5. A composition as claimed in any one of Claims 1 to 4 containing 11 to 20% by weight of (A).

6. A composition as claimed in any one of Claims 1 to 5 in which the cationic fabric softener is selected from the group consisting of quaternary ammonium salts of formula I, alkyimidazolinium salts of formula II and mixtures thereof:



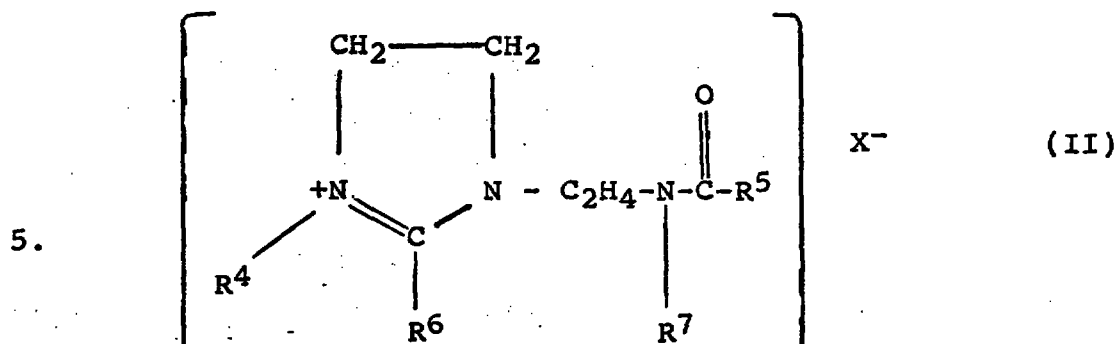
where R represents a hydrocarbyl group of from about 12 to 24 carbon atoms;

R¹ represents a lower alkyl group of from 1 to 4 carbon atoms or a hydrocarbyl group of from 12 to 24 carbon atoms;

R² represents a lower alkyl group of 1 to 4 carbon atoms;

R³ represents a lower alkyl group of 1 to 4 carbon atoms; and each of R, R¹, R² and R³ may be unsubstituted or substituted, and

X represents a salt-forming anion;



- where R⁴ represents a hydrogen atom or a lower alkyl group of 1 to 4 carbon atoms;
- R⁵ represents an alkyl group of from 9 to 25 carbon atoms;
- R⁶ represents an alkyl group of from 8 to 25 carbon atoms;
- R⁷ represents a hydrogen atom or an alkyl group of 1 to 4 carbon atoms; and
- X represents a salt-forming anion.
7. A composition as claimed in Claim 6 in which
- R and R¹ each represents a hydrocarbyl group of 14 to 22 carbon atoms;
- R² and R³ each represent an alkyl group of 1 to 3 carbon atoms;
- R⁴ and R⁷ each represent a hydrogen atom or an alkyl group of 1 or 2 carbon atoms; and
- R⁵ and R⁶ each represent a linear alkyl group of from about 13 to 23 carbon atoms.

30.

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8. A composition as claimed in any one of Claims 1 to 5 in which the cationic fabric softener is distearyl dimethyl ammonium chloride.

9. A composition as claimed in any one of Claims 1 to 8 in which the fatty alcohol has a straight or branched alkyl group having from about 12 to 20 carbon atoms.

10. A composition as claimed in Claim 9 in which the fatty alcohol has from 16 to 18 carbon atoms in the alkyl group.

11. A composition as claimed in any one of Claims 1 to 10 which contains 3 to 8% by weight of (A).

12. A composition as claimed in Claim 11 in which (B) is present in an amount in the range of from 0.1 to 2% by weight.
