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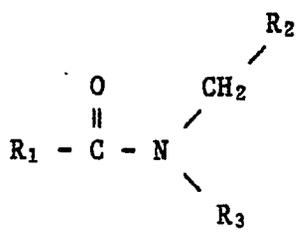
(54) Fabric softening composition and detergent-composition comprising the same.

(57) A detergent compatible granular fabric softening composition, comprising a water soluble quaternary ammonium compound, a clay having an ion exchange capacity of at least 50 meq./100g and one or more amides, imides and urea derivatives according to four specifically defined formulae.

A preferred group of amides to be applied are those according to the formula



wherein R_1 and R_2 are the same or different and represent C_1-C_{22} alkyl groups and wherein R_2 additionally may represent hydrogen and wherein R_3 represents hydrogen, C_1-C_{22} alkyl, $-(C_2H_4O)_xH$ or $-(C_3H_6O)_xH$ wherein x has a value of 1 to 25, with the proviso that the sum of the carbon atoms of two radicals of R_1, R_2 and R_3 is at least 16. More preferred are N-stearylstearamide or N-oleylpalmitamide.

Additionally the invention relates to detergent-compositions comprising these softening compositions in an amount from 0.5 to 50% by weight and preferably 2-20% by weight.

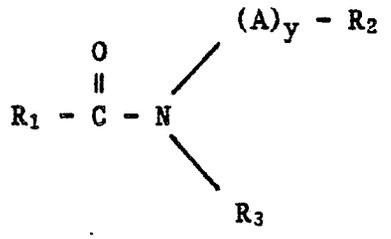
EP 0 258 500 A1

Fabric softening composition and detergent-composition comprising the same

The present invention relates to a detergent compatible granular fabric softening composition comprising a water-soluble quaternary ammonium compound and a clay having an ion-exchange capacity of at least 50 meq/100 grams. This softening composition is known from European Patent Specification No. 0 026 529. It is incorporated into detergent compositions containing an anionic surfactant. In said specification a solution is proposed to the problem of formulating a detergent compostion having good cleaning and softening properties. In this way it should be tried to prevent the quaternary ammonium compound from interacting with the anionic surfactant which is usually present in conventional detergent compositions. It is true that by applying this softening system better cleaning and softening results can be obtained. Although the detergent compositions wherein such softening compositions are included, show relatively improved cleaning and softening characteristics, there is still a need for further improvement of the softening characteristics, without detracting from the present level of cleaning properties.

Extensive research and experimentation have resulted in such a desired further improved detergent-compatible granular fabric softening system, which is characterized in that it further comprises one or more amides, imides and urea derivatives selected from the group consisting of compounds having the formula:

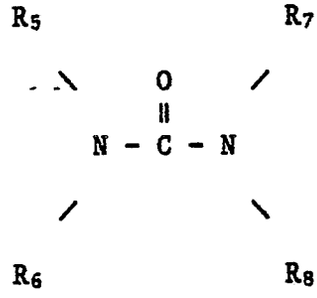
a)



I

wherein A represents a methylene or a carbonyl group, wherein y represents 1 or 0, wherein R_1, R_2 are the same or different and represent C_1-C_{22} alkyl groups, wherein R_2 can represent additionally hydrogen, wherein R_3 represents hydrogen, C_1-C_{22} alkyl, $-(C_2H_4O)_xH$ or $-(C_3H_6O)_xH$, where x has a value of 1 to 25 with the proviso that the sum of the carbon atoms of two radicals of R_1, R_2 or R_3 is at least 16.

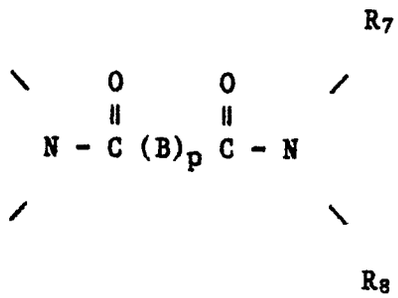
b)



II

wherein two of the groups R_5, R_6, R_7 and R_8 are the same or different and represent C_8-C_{22} alkyl groups and two of the groups R_5, R_6, R_7 and R_8 are the same or different and represent hydrogen, C_1-C_{22} alkyl, $-(C_2H_4O)_xH$ or $-(C_3H_6O)_xH$, where x has a value of 1 to 25.

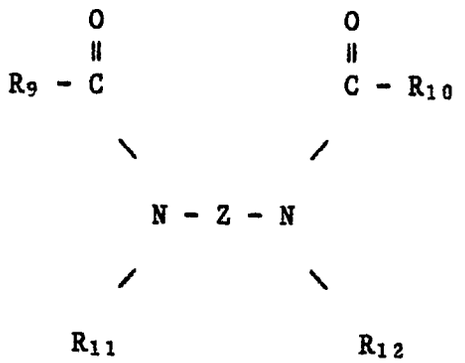
c)



III

wherein R_5, R_6, R_7 and R_8 have the same meaning as given under b, B represents C_4-C_{10} alkylene-1,3 phenylene, 1,4 phenylene, 1,3-cyclohexylene or 1,4-cyclohexylene and wherein p being 0 or 1.

d)



IV

wherein Z represents C_1-C_{12} alkylene, 1,3-phenylene, 1,4-phenylene, 1,3-cyclohexylene or 1,4-cyclohexylene, R_9 and R_{10} are the same or different and represent C_1-C_{21} alkyl groups, R_{11} and R_{12} are the same or different and represent hydrogen, C_1-C_{22} alkyl, $-(C_2H_4O)_xH$ or $(C_3H_6O)_xH$, wherein x has a value of 1 to 25, or form together with the moiety -N-Z-N-a heterocyclic ring structure such as piperazinylene or imidazolidinylene.

With the term alkyl in the definitions of all groups of the formulae I-IV is meant alkyl groups which are linear, branched, saturated, unsaturated, unsubstituted or substituted by e.g. a hydroxyl group.

It should be noted that US 3 231 508 and US 3 285 856 disclose the use of N-C_1-C_{22} alkyl fatty acid amides as foam suppressors in anionic detergents. No mention is made however of the present three-component softening formulation.

It should be further noted that US 4 497 715 discloses the use of a N-C_{1-18}alkylisostearamide adsorbed onto a Bentonite® clay in an anionic detergent composition. The compositions disclosed in this patent are meant to be an alternative and an improvement to the quaternary ammonium compounds. The present invention however provides a three component system, which shows improved fabric softening properties as compared with those of the additives described in US 4 497 715.

From British patent publication GB 2160.886A solid detergent bar articles having a softening action are known. These detergent bar articles contain besides a great number of different ingredients, a long-chain aliphatic amide. This amide is clearly meant to serve as a lathering agent in the form of a fatty acid alkanolamide and is clearly not suggestive at all to persons skilled in the art of the attractive softening properties of the present three-component system.

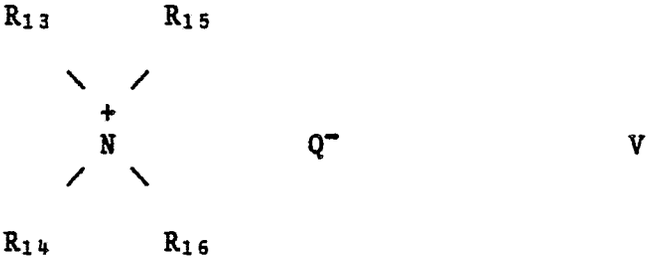
European patent Specification 0 026 528 suggests using a three-component softening composition, the third component being an insoluble tertiary amine instead of the presently proposed amides, imides and/or urea derivatives. As to these prior art compositions containing an insoluble tertiary amine those of the present invention contain amides, imides and urea derivatives, which possess more attractive physiological and physical properties in that they do not show the unpleasant fishy odour and are less irritant to skin and eyes. In addition the amines, which were practically used for prior art compositions have melting points

which are generally below 40°C, whereas many representatives of the amides, imides and urea derivatives to be applied according to the present invention melt at higher temperatures. This diminishes the risk of caking of the complete detergent composition wherein the amide, imide or urea derivative has been finally incorporated.

In particular, the present softening composition should consist of at least three components selected from:

a) a water-soluble quaternary ammonium compound
b) a clay having an ion-exchange capacity of at least 50 meq./100 grams of clay and
c) the amide, imide or urea derivative as specified above.

The water soluble quaternary ammonium compound should consist of one or more members selected from the group consisting of compounds of the formulae a-d;

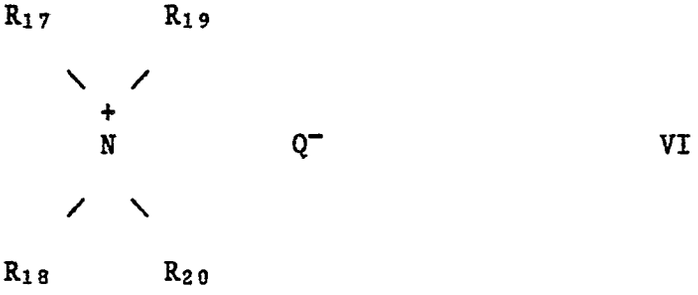
a) 

V

wherein R_{13} represents C_8-C_{18} alkyl being saturated and/or unsaturated, or 2-(C_8-C_{18}-acyloxy)ethyl, wherein R_{14}, R_{15} and R_{16} are the same or different and represent C_1-C_4 alkyl benzyl, 2 methoxy-2-oxoethyl, 2-ethoxy-2-oxoethyl, $-(C_2H_4O)_xH$ or $-(C_3H_6O)_xH$ wherein x has a value from 1 to 5, Q is an anion, e.g. a halide, preferably bromide or chloride, methosulphate or ethosulphate. Of the groups R_{14}, R_{15} and R_{16} not more than one may be benzyl, 2-methoxy-2-oxoethyl or 2-ethoxy-2-oxoethyl.

Examples of suitable representatives of this group (a) are:

1. coco-alkyl trimethyl ammonium chloride
2. coco-alkyl trimethyl ammonium bromide
3. coco-alkyl methyl bis(2-hydroxyethyl)ammonium chloride
4. coco-alkyl methyl bis(2-hydroxyethyl)ammonium bromide
5. myristyl trimethyl ammonium methosulphate
6. lauryl dimethyl benzyl ammonium chloride
7. lauryl methyl (ethenoxy)$_4$ ammonium bromide
8. palmityl trimethyl ammonium chloride
9. palmityl trimethyl ammonium bromide
10. tallow-alkyl trimethyl ammonium chloride
11. stearyl trimethyl ammonium bromide
12. tallow-alkyl methyl bis(2-hydroxyethyl)ammonium chloride
13. 2-(coco-acyloxy)ethyl trimethyl ammonium chloride
14. 2-(coco-acyloxy)ethyl methyl bis(2-hydroxyethyl)ammonium chloride
15. coco-alkyl dimethyl(2-methoxy-2-oxoethyl)ammonium chloride

b) 

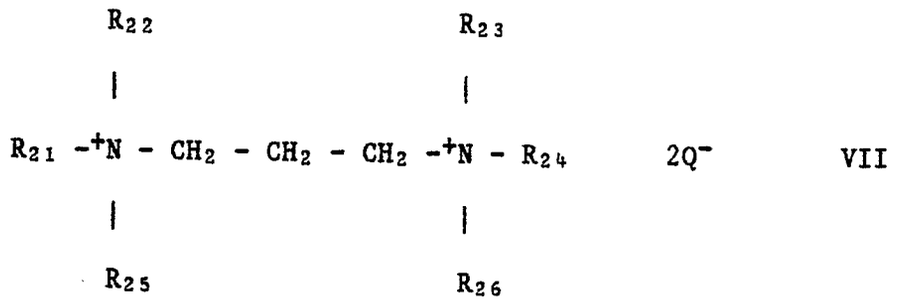
VI

wherein R_{17} and R_{18} are the same or different and represent C_6-C_{10} alkyl (both R_{17} and R_{18}), C_8-C_{18} alkyl (R_{17}) and C_6-C_{10} branched alkyl (R_{18})
wherein R_{19} and R_{20} are the same or different and represent C_1-C_4 alkyl, benzyl, $-(C_2H_4O)_xH$ or $(C_3H_6O)_xH$ wherein x has a value from 1 to 5
wherein Q is an anion such as halide (preferably chloride or bromide), methosulphate or ethosulphate.
Of R_{19} and R_{20} not more than one may be benzyl.

Examples of suitable representatives of this group (b) are:

1. dioctyl dimethyl ammonium chloride
2. hexyl decyl dimethyl ammonium chloride
3. didecyl dimethyl ammonium bromide
4. coco-alkyl 2-ethylhexyl dimethyl ammonium chloride
5. tallow-alkyl 2-ethylhexyl dimethyl ammonium chloride

c)



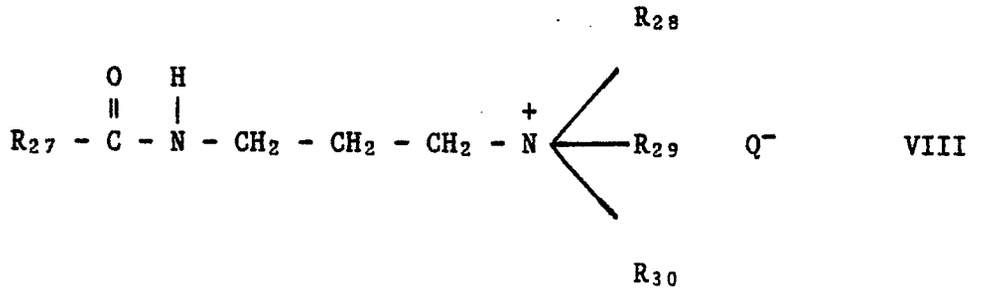
VII

wherein R_{21} is C_8-C_{18} alkyl (saturated and/or unsaturated), wherein R_{22}, R_{23} and R_{24} represent C_1-C_4 alkyl, $-(C_2H_4O)_xH$, or $-(C_3H_6O)_xH$ wherein x has a value from 1 to 5,
and wherein R_{25} and R_{26} represent C_1-C_4 alkyl; Q is an anion e.g. halide (preferably chloride or bromide), methosulphate or ethosulphate.

Examples of suitable representatives of this group (c) are:

1. 1,3-propane diaminium, N,N,N,N',N'-pentamethyl N'-coco alkyl dibromide
2. 1,3-propane diaminium, N,N,N,N',N'-pentamethyl N'-coco alkyl dichloride
3. 1,3-propane diaminium, N,N,N'-tris(2-hydroxyethyl)-N,N'-dimethyl-N'-coco alkyl dichloride
4. 1,3-propane diaminium, N,N,N'-tris(2-hydroxyethyl)-N,N'-dimethyl-N'-coco alkyl dibromide
5. 1,3-propane diaminium, N,N,N'-tris(2-hydroxyethyl)-N,N'dimethyl-N'-tallow alkyl dichloride
6. 1,3-propane diaminium, N,N,N'-tris(2-hydroxyethyl)-N,N'-dimethyl-N'-tallow alkyl dibromide

d)



VIII

wherein R_{27} represents a C_7-C_{17} alkyl (saturated and/or unsaturated) R_{28}, R_{29} and R_{30} are the same or different and represent C_1-C_4 alkyl, benzyl, $-(C_2H_4O)_xH$ or $-(C_3H_6O)_xH$, wherein x has a value from 1 to 5, Q is an anion such as halide (preferably chloride or bromide) methosulphate or ethosulphate while of R_{28}, R_{29} and R_{30} not more than one may represent benzyl.

Examples of suitable representatives of this group (d) are:

1. N-(3-lauramido propyl)-N,N,N-trimethyl ammonium bromide
2. N-(3-lauramido propyl)-N,N,N-trimethyl ammonium chloride
3. N-(3-cocoamido propyl)-N,N,N-trimethyl ammonium chloride
4. N-(3-cocoamido propyl)-N,N-dimethyl-N-(2-hydroxyethyl) ammonium bromide

The composition of the quaternary ammonium compounds to be used for the present fabric softening compositions may be prepared by the following methods:

The exemplified compounds 1-12 and 15 of the group a can be prepared from the corresponding tertiary amines which are commercially available (e.g. Armeen®, Ethomeen®) viz. by quaternisation with methylchloride, methylbromide, dimethyl sulphate, benzyl chloride, methyl chloroacetate or ethyl chloroacetate.

Such quaternisation reaction is usually carried out at 50°-110°C, using water or 2-propanol or mixtures thereof as an optional solvent.

The exemplified compounds 13, 14 of the group a can be prepared by quaternisation as described hereinbefore of tertiary amines, which are obtained by esterification of 1 mole of fatty acid (e.g. coconut fatty acids) with 1 mole of N,N-dimethyl ethanolamine, or 1 mole of N-methyl diethanolamine or of 1 mole of triethanolamine. Such esterification can be performed at 150°-200°C.

The exemplified compounds 1-5 of the group b can be prepared from the corresponding secondary amines ($R_{17}R_{18}NH$) using, per mole of amine, 1 mole of methylation agent (methyl chloride, methyl bromide) in the presence of 1 mole of sodium hydroxide to convert the secondary amine into the tertary amine, and subsequently another 1 mole of the same methylation agent for conversion into the quaternary ammonium compound. These reactions are usually carried out at 50°-100°C, applying water or 2-propanol or mixtures thereof as the solvent.

The secondary amines can be obtained via several routes the choice of which partly depends on the structure of the end product required. These routes are, e.g.:

-hydrogenation of the corresponding alkylnitrile over a hydrogenation catalyst while venting off ammonia

-alkylation of ammonia by the corresponding alkanols, using hydrogen and a hydrogenation catalyst

-from a corresponding primary amine and a corresponding aldehyde; the imine formed from those is subsequently hydrogenated over a hydrogenation catalyst. Such a procedure is described in U.S. Patent 4,569,800.

The exemplified representatives 1-6 of the group c may be prepared from the corresponding diamines (Duomeen®) or ethoxylated diamines (Ethoduomeen®), viz. by methylation with methyl chloride or methyl-bromide at 50°-110°C.

The exemplified quaternary ammonium compounds 1-4 of the group d can be prepared by quaternisation of amido-amines which are obtained from N,N-dimethyl-1,3-propanediamine in a condensation reaction with the corresponding fatty acid at 170°-220°C. The quaternisation can be achieved by using methyl chloride or methyl bromide at 50°-110°C (ex. 1-3), or by using ethylene oxide and an equimolar amount of acid (e.g. HBr, ex. 4) at 40°-90°C.

The clays which may be suitably applied in the softening systems of the present invention may be selected from clay materials known for this purpose from e.g. British patent publication no. 2020 689 and European patent publication 0026 529. Use is preferably made of the clays of the impalpable smectite type, having an ion exchange capacity of at least 50 meq./100g clay and preferably at least 70 meq./100g clay and having a particle size range from 5 micron to 50 micron (μm).

Examples of such clays are alkalimetal montmorillonites (such as sodium montmorillonite), alkali metal saponites (such as sodium saponite), alkali metal hectorites (such as sodium or lithium hectorite) and alkaline earth metal compounds of these minerals, such as calcium montmorillonite. Examples of preferably used smectite clays are Gelwhite GP®, Volclay BC®, Imvite K® and Bentonite DT-X®.

The smectite type clay may be present in the softening composition in such an amount that it will occur in the complete detergent composition, wherein the present softening compositions have been included, in an amount of from 1,5% to 45% by weight of the composition preferably from 2% to 15% and more preferably from 4% to 12% by weight.

As indicated hereinbefore the fabric softener composition should further contain one or more amides, imides or urea derivatives according to the general formula I-IV.

Preferred compounds according to formula I are those, wherein at least one of the groups R_1 and R_3 is a long-chain alkyl group, i.e. either R_1 is C_7-C_{21} alkyl or R_3 is C_8-C_{22} alkyl or both represent such an alkyl group and wherein y = 1.

Examples of compounds wherein A represents a carbonyl group are:

-di)hydrogenated tallow) imide

-N-acetyl-N-stearylstearamide

More preferably, A should represent a methylene group.

Examples of such compounds are:

-N,N-di(hydrogenated tallow) acetamide

-N,N-di(hydrogenated tallow) pelargonamide

-N-coco stearamide

-N-hydrogenated tallow cocamide

Most preferably R_1 represents C_{11}-C_{21} alkyl groups, R_2 represents C_{11}-C_{21} alkyl groups (A being methylene) and R_3 is hydrogen.

Examples of these preferred N-alkyl fatty amides are:

- N-stearyl stearamide
-N-oleyl palmitamide
-N-stearyl erucamide
-12-hydroxy-N-octadecyl octadecanamide
-N tallow oleamide

Particularly preferred amides are N-stearyl stearamide and N-oleylpalmitamide. The N-alkyl fatty amides can be prepared by reacting the corresponding fatty acid and fatty primary amine in a 1:1 molar ratio at 170°C-220°C during 5-10 hours while distilling off water from the condensation reaction mixture.

The preferred compounds of the group according formula II are those in which R_5 and R_7 represent C_{12}-C_{22} alkyl groups and in which R_6 and R_8 are hydrogen.

Examples of such compounds are:

-N-(hydrogenated tallow)-N'-octadecyl urea
-N,N'-dioctadecyl urea
-N-dodecyl-N'-octadecyl urea
-N,N'-didodecyl urea
-N-(13-docosenyl)-N'-octadecyl urea

These urea derivatives can be prepared by reacting the corresponding alkyl isocyanate and alkyl amine at 25°-67°C in tetrahydrofuran from which reaction mixture the urea derivative precipitates and can be isolated by filtration in 90-98% yield.

Preferred compounds of the group represented by formula III are those wherein R_5 and R_6 represent C_{12}-C_{22} alkyl groups and wherein R_8 and R_8 represent hydrogen.

Examples of preferred representatives of this group are:

-N,N'-dioctadecyl adipamide
-N,N'-dioctadecyl azelaic amide
-N,N'-dioctadecyl-1,4-cyclohexane dicarboxamide

The compounds according to the formula III can be prepared by reacting the corresponding dicarboxylic acid and alkyl amine in a molar ratio of 1:2 at 170°-220°C for 5-10 hours, while distilling off water from the condensation reaction mixture. Alternatively, these compounds can be prepared by reacting the corresponding dicarboxylic acid with the alkyl isocyanate until all the carbon dioxide has evolved, controlling the temperature at max. 150°C.

Preferred representatives of the group of compounds according to formula IV are those wherein R_9 and R_{10} represent C_{11}-C_{21} alkyl groups and wherein R_{11} and R_{12} are hydrogen.

Examples of preferred compounds are:

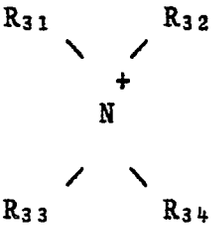
-ethylene bis-stearamide
-methylene bis-stearamide
-hexamethylene bis-lauramide
-p-phenylene bis-palmitamide

Most of these compounds can be prepared from the corresponding diamines in a condensation reaction at 170°-220°C with 2 moles of fatty acid (per mole of diamine). Instead of diamines, the corresponding diisocyanates if available can be used in a reaction at more moderate temperatures. Methylene bis-stearamide can be prepared from stearonitrile (e.g. Arneel HT®) and formaldehyde (e.g. 1,3,5-trioxane) in the presence of water and an excess of strong acid (e.g. sulphuric acid) at temperatures below 50°C.

In the fabric softening composition the weight ratio between the amide and the water soluble quaternary ammonium compound should be in the range of from 10:1 to 1:3 and preferably of from 7:1 to 1:1 and most preferably of from 6:1 to 2:1.

The weight ratio of the amide together with the soluble quaternary ammonium compound to the clay should be in the range of from 4:1 to 1:4 and preferably of from 2:1 to 1:2.

According to a preferred embodiment of the present invention, the softening composition further comprises an insoluble quaternary ammonium compound of the formula:



IX

wherein R_{31} and R_{32} are the same or different and represent C_{12}-C_{22} alkyl, groups wherein R_{33} and R_{34} are the same or different and represent C_1-C_4 alkyl groups, $-(C_2H_4O)_xH$ or $(C_3H_6O)_xH$ wherein x has a value of 1 to 5 and wherein Q represents a halide ion (preferably bromide or chloride ion), methosulphate or ethosulphate.

Examples of these compounds are:

-di(hydrogenated tallow) dimethyl ammonium chloride
-di tallow dimethyl ammonium chloride
-di tallow-2-hydroxypropyl methyl ammonium chloride
-di(hydrogenated tallow)-2-hydroxyethyl methyl ammonium chloride
-di(hydrogenated tallow)-2-hydroxyethyl methyl ammonium bromide
-di(hydrogenated tallow) dimethyl ammonium methosulphate
-di(hydrogenated tallow) ethyl methyl ammonium ethosulphate

The insoluble quaternary ammonium compound, if present in the softening composition, replaces the amide(s), imide(s) or urea derivative(s) to a certain extent. More preferably, the insoluble quaternary ammonium compound is present in a weight ratio of 1:2 to 2:1 relative to e.g. the amide, the total amount of insoluble quaternary ammonium and of the amide present in the composition being in a ratio of 10:1 to 1:3 and preferably from 7:1 to 1:1 relative to the soluble quaternary ammonium. Furthermore, the total of insoluble quaternary ammonium, the imide or urea derivative and the soluble quaternary ammonium are in a weight ratio to the clay of 4:1 to 1:4 and preferably from 2:1 to 1:2. The insoluble quaternary ammonium compound, if used, is usually present in an amount of 5-30% by weight, calculated on the softening composition.

A preferred composition consist e.g.

1-2 parts by weight of di(hydrogenated tallow) dimethyl ammonium chloride
4-6 parts by weight of clay (Bentonite® DTX)
1-2 parts by weight of N-stearylstearamide
0,7-1,5 parts by weight of coco-alkyl trimethyl ammonium chloride

The detergent compositions which include the fabric softening composition can be prepared in various ways, as appropriate to their physical form, i.e. by mixing the components into a slurry followed by spray drying or other means of granulation, or by dispersing them in an appropriate liquid. The fabric softening composition which forms an independent feature of the present invention is prepared separately in the form of a granular powder, which may subsequently be admixed into the detergent base composition.

As to the preparation of the separate fabric softening composition, several ways of processing the three or four components into a granular powder are possible in principle. It is possible to mix the clay intensively with powdered amide, e.g. in a Nauta-mixer, and subsequentlyto add aqueous soluble quaternary ammonium at 50°C over a period of 2 hours, and allowing excess water to evaporate. A suitable powder can then be obtained by grinding and sieving through 0,5 mm.

Alternatively, clay, aqueous soluble quaternary ammonium and insoluble quaternary ammonium can be homogenized in a stirred reactor, the slurry obtained can be extruded (e.g. 4,5 mm), the extrudate dried at 100°C and ground. Powdered amide can then be added, followed by additional grinding and sieving through 0,5 mm.

Another possibility is to mix aqueous soluble quaternary (and optionally: insoluble quaternary) into the clay in a Nauta-mixer at 95°C allowing excess water to evaporate. Subsequently, molten amide, imide or urea derivative can be added at 100°C. After further mixing and cooling, the granulate can be ground and sieved through 0,5 mm.

It is also possible to prepare a powdered mixture of soluble quaternary and insoluble quaternary by spray-drying, and to mix these powders with clay and with e.g. powdered amide. Grinding and sieving through 0,5 mm gives a suitable powder. The preferred method of processing is to make a hot dispersion of amide or the like and aqueous soluble quaternary (or optionally: insoluble quaternary) at 80°-100°C, and to add this dispersion to clay at 20°-60°C in a Nauta-mixer. Mixing is continued for 2 hours at 40°-60°C, after which the cooled granulate is ground and sieved through 0,5 mm.

The present softening system may be incorporated into usual detergent compositions in an amount of 0,5 to 50% by weight, calculated on the complete detergent composition.
Preferably the softening composition is present in an amount of 2 to 20% and more preferably 4 to 10% by weight, calculated on the complete detergent composition.

The complete detergent compositions of the present invention may of course include additional components that are usually found in laundry detergents as is known e.g. from European Patent Specification no. 0026 529. These components include an anionic surfactant, in an amount of 3 to 40% by weight, calculated on the complete detergent composition, builder salts in amounts usually from 10 to 80% by weight, calculated on the complete composition and more preferably 30 to 60% by weight, bleaching agents in an amount usually from 5-35% by weight, calculated on the complete composition, bleach stabilizers, suds controlling or suppression agents, soil suspending and anti redeposition agents, enzymes, optical brighteners, colouring agents and perfumes in minor amounts ≤ 0,5% by weight, calculated on the complete composition.

The invention will be illustrated by the following examples, however without any restriction of the scope of the invention to these specific embodiments.

Example 1

Several test detergent compositions, containing softening compositions were prepared from a standard detergent composition consisting of:
linear sodium alkyl benzene sulphonate 6,4%
mean length of alkane chain 11,5 ethoxylated tallow alcohol (14 E.O.) 2,3%
sodium soap 2,8%
chain length C_{12-16}:13-26%
C_{18-22}:74-87%
sodium triphosphate 35%
sodium silicate (SiO_2:Na_2O = 3:3:1) 6,0%
magnesium silicate 1,5%
carboxymethylcellulose 1,0%
sodiumethylenediaminetetraacetate 0,2%
optical whitener for cotton (stilbene type) 0,2%
sodium sulphate 16,8%
water 7,8%
sodium perborate tetrahydrate 20,0%

Starting from this basic composition final testformulations were prepared, comprising:

amide	4% by weight	of total composition
clay	4% by weight	
monococo trimethyl ammonium chloride (MCTMAC)	2% by weight	

or

amide	4% by weight	of total composition
clay	6% by weight	
MCTMAC	1% by weight	

In these compositions as amide was respectively used stearic stearyl amide, palmitic oleyl amide, erucic-hydrogenated tallow amide, 12 OH-stearic-hydrogenated tallow amide and pelargonic acid-dihydrogenated tallow amide.

The final compositions were then used to wash terry towels in an amount of 4 kg wash load at a 95°C program, 18°dH in a Miele WS 1504 washing machine with a dosage of 260 g of testdetergent.

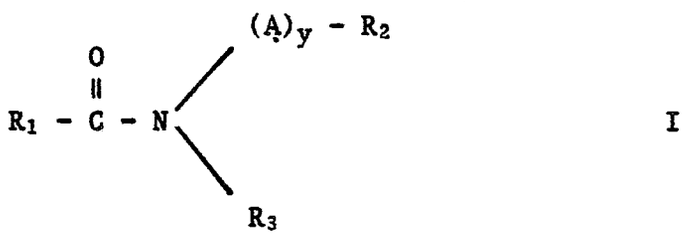
For softening evaluation treated towels are line dried for 24 hours and cut into swatches of 10 x 20 cm size and graded by a test panel relative to the basic IEC-testdetergent and commercially available softergents as reference.

With these tests a significant superiority as to softening was found relative to the standard IEC testdetergent and a comparable softening as to commercially available softergents.

Claims

1. A detergent compatible granular fabric softening composition comprising a water soluble quaternary ammonium compound and a clay having an ion-exchange capacity of at least 50 meq/100 grams, characterized in that it further comprises one or more amides imides and urea derivatives selected from the group consisting of compounds having the formula:

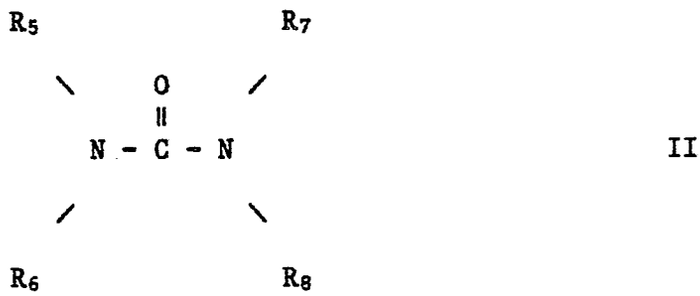
a)



I

wherein A represents a methylene or a carbonyl group wherein y represents 1 or 0, wherein R_1, R_2 are the same or different and represent C_1-C_{22} alkyl groups, wherein R_2 can represent additionally hydrogen and wherein R_3 represents hydrogen, C_1-C_{22} alkyl, $-(C_2H_4O)_xH$ or $-(C_3H_6O)_xH$, where x has a value of 1 to 25 with the proviso that the sum of the carbon atoms of two radicals of R_1, R_2 or R_3 is at least 16.

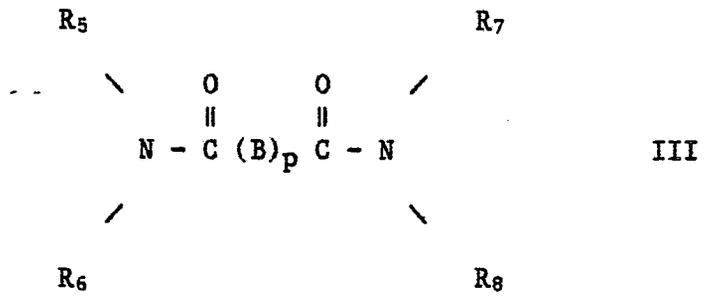
b)



II

wherein two of the groups R_5, R_6, R_7 and R_8 are the same or different and represent C_8-C_{22} alkyl groups and two of the groups R_5, R_6, R_7 and R_8 are the same or different and represent hydrogen, C_1-C_{22} alkyl, $-(C_2H_4O)-_xH$ or $-(C_3H_6O)_xH$, where x has a value of 1 to 25.

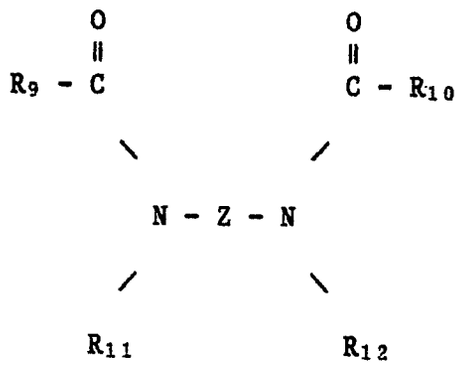
c)



III

wherein R_5, R_6, R_7 and R_8 have the same meaning as given under b, B represents C_4-C_{10} alkylene, 1,3-phenylene, 1,4-phenylene, 1,3-cyclohexylene or 1,4-cyclohexylene and wherein p being 0 or 1.

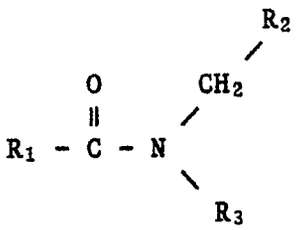
d)



IV

wherein Z represents C_1-C_{12} alkylene, 1,3 phenylene, 1,4 phenylene, 1,3-cyclohexylene or 1,4-cyclohexylene, R_9 and R_{10} are the same or different and represent C_1-C_{21} alkyl groups, R_{11} and R_{12} are the same or different and represent hydrogen, C_1-C_{22} alkyl, $-(C_2H_4O)_xH$ or $(C_3H_6O)_xH$, wherein x has a value of 1 to 25, or form together with the moiety -N-Z-N-a heterocyclic ring structure such as piperazinylene or imidazolidinylene.

2. A fabric softening composition according to claim 1 characterized in that the amide is of the formula



wherein R_1, R_2 and R_3 have the meaning as indicated.

3. A fabric softening composition according to claim 2, characterized in the R_1 and R_2 are the same or different and represent C_{11}-C_{21}-alkyl groups and R_3 is hydrogen.

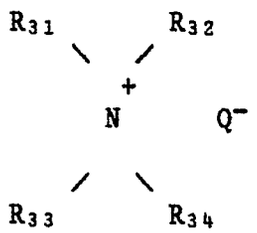
4. A fabric softening composition according to claim 3, characterized in that the amide is N-stearylstearamide or N-oleylpalmitamide.

5. A fabric softening composition according to any one of the preceding claims, characterized in that the weight ratio of the amide, imide or urea derivative to the soluble quaternary ammonium compound is in the range of 10:1 to 1:3, preferably from 7:1 to 1:1.

6. A fabric softening composition according to claim 5 characterized in that the weight ratio of the amide imide or urea derivative to the soluble quaternary ammonium compound is in the range from 6:1 to 2:1.

7. A fabric softening composition according to any one of the preceding claims, characterized in that the weight ratio of the amide plus the soluble quaternary ammonium compound to the clay is in the range from 4:1 to 1:4, preferably from 2:1 to 1:2.

8. A fabric softening composition according to any one of the preceding claim, characterized in that it further comprises an insoluble quaternary ammonium compound of the formula



wherein R_{31} and R_{32} are the same or different and represent C_{12}-C_{22} alkyl, groups R_{33} and R_{34} are the same or different and represent C_1-C_4 alkyl groups, $-(C_2H_4O)_xH$ or $(C_3H_6O)_x$ H wherein x has a value of 1 to 5 and wherein Q represents a halide ion, methosulphate or ethosulphate.

9. A detergent composition comprising 0,5 to 50 percent by weight of the fabric softening composition according to anyone of the preceding claims.

10. A detergent composition according to claim 9, characterized in that it contains 3 to 40 percent by weight of anionic surfactant and 2 to 20 percent by weight of the fabric softening composition.

11. A detergent composition according to claim 9 or 10, characterized in that it contains 4 to 10 percent of the fabric softening composition.

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 86 20 1512

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	FR-A-2 218 426 (PROCTER & GAMBLE) * Claims *	1-11	C 11 D 3/12 C 11 D 1/62 C 11 D 1/52 C 11 D 3/32
Y	US-B- 305 417 (J.P.NIRSCHL et al.) * Column 11, line 37 - column 12, line 26; claims *	1-11	
A	EP-A-0 164 797 (PROCTER & GAMBLE) * Claims *	1	
A	GB-A-2 141 152 (COLGATE-PALMOLIVE) * Claims *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

C 11 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	07-05-1987	GOLLER P.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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