United States Patent

Heins et al.

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[54] AGENT FOR THE POST-TREATMENT OF WASHED LAUNDRY

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[52] **U.S. Cl.** .....**252/8.8**, 117/47 R, 117/66, 117/139 SF, 117/139.5 CQ, 252/8.6, 252/8.9

[51] **Int. Cl.** **D06m 13/40**

[58] **Field of Search** .....252/8.8, 152, 137; 117/139 SF, 117/47 R

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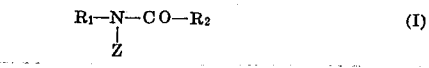
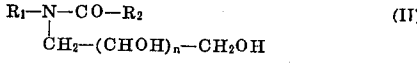
[57] **ABSTRACT**

Compositions for the posttreatment of washed laundry, the same being adapted for addition to the rinse water either as a solid or in liquid form comprising a softening agent corresponding to the following formula:



(I)

alone or in combination with a softening agent corresponding to the following formula:



(II)

wherein R_1 is alkyl containing 10 to 22 carbon atoms and may be interrupted by ether oxygen atoms in the vicinity of the NH_2 group, R_2 is alkyl containing seven to 21 carbon atoms, the total number of carbon atoms contained in R_1 and R_2 amounting to from 23 to 39, n is either 3 or 4 and Z is either

the polyhydroxyl radicals present in the compounds I and II may be etherified with additional polyhydroxylalkyl radicals. The aforesaid softening agent (I) or agents (I and II) can be employed per se or in combination with other conventional laundry agents such as optical brighteners, deacidifiers, disincrusting agents, colorants, perfumes, antimicrobial agents, etc.

8 Claims, No Drawings

AGENT FOR THE POST-TREATMENT OF WASHED LAUNDRY

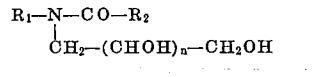
This invention relates to softening agents for use in the post-treatment of washed laundry, to compositions containing such softening agents as active ingredient and to the methods of preparing and using such agents and compositions.

Following drying of wet textiles, particularly those prepared on a basis of cotton or similar cellulosic fibers, a perceptible hardening of the feel of the fabrics can be detected. This is particularly unpleasant in the case of underclothing, table linens and handkerchiefs, i.e., articles which are subjected to frequent and repeated washing, especially when they are washed in drum-type washing machines, whether in the home or in an industrial laundry.

This undesirable loss of good feel in the laundering process can be avoided if cationic substances are added to the final rinse, which substances contain at least two fatty radicals of high molecular weight in their molecules. In practice, dialkyl dimethyl ammonium salts that are dispersable in water have become popular for this purpose, each of the two alkyl radicals in this latter compound contains 16 to 18 carbon atoms. These cationic softening agents are usually marketed in the form of their aqueous dispersions.

Although when these cationic softening agents are used in the final rinse the undesirable hardness is not found in the laundry after drying, the use of these products entails certain disadvantages. If the detergent dissolved in the final wash has not been entirely removed from the clothing, which may be the case, particularly in tub-type washing machines, precipitates are formed between the cationic softening agents and the anionic wash-active substances, thereby diminishing or obstructing the softening effect. Furthermore, these precipitates can themselves be deposited on the fibers and cause yellowing of the laundered items. Furthermore, the absorbency of the washed goods is adversely affected by the softening agents as known in the prior art. Even in the case of drum-type washing machines, in which the rinsing action is generally better than it is in tub-type machines, a reduction of the absorbency of the posttreated clothing can be observed, apparently because small amounts of the anionic wash-active substances are fixed on the fibers and then react with the cationic softening agents.

In U.S. Pat. application Ser. No. 656,136 there are described preparations for use in the posttreatment of washed laundry, which contain as textile-softening agent compounds having the following formula:



wherein R_1 represents an alkyl radical having 10 to 22, preferably 12 to 20 and most preferably 16 to 18 carbon atoms, R_2 represents an alkyl radical having seven to 21, preferably 11 to 19, and most preferably 15 to 17 carbon atoms, and *n* is either of the whole numbers 3 or 4, further wherein the alkyl radical R_1 can be interrupted by an ether oxygen atom in the vicinity of the NH_2 group, and the sum of the carbon atoms contained in R_1 and R_2 amounts to from 23 to 39, preferably from 27 to 35. These softening agents can be employed in the treatment of washed textiles, alone or together with other conventional laundry posttreatment agents, such as acidifiers or disincrusting agents, optical brighteners and/or heavy metal-free, nonoxidizing, water-soluble antimicrobial agents, as well as surfactants provided that the quantity of surfactants present does not exceed that of the textile-softening agent.

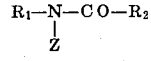
In. U.S. Pat. application Ser. No. 749,596, now pending preparations are disclosed corresponding to the above but additionally containing at least one heavy metal-free, nonoxidizing, water-soluble antimicrobial agent. The antimicrobial agents can include zwitter-ionic surfactants, but in this case, the quantity of zwitter-ionic surfactants is always less than that of the textile-softening agent present.

It is an object of this invention to eliminate the disadvantages of the prior art methods of posttreating laundry by the provision of a new and improved softening agent.

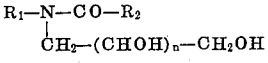
It is an additional object of the invention to provide laundry posttreatment agents which contain the active softening agent of the invention in a form designed for easy and practical use.

These and other objects and advantages of the invention will become apparent from a further consideration of the following disclosure.

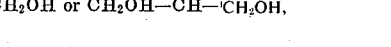
According to the invention it has now been found that laundry treated, after washing, with an aqueous solution or dispersion of a softening agent, in solid or liquid form corresponding to the following formula:



alone or in combination with a softening agent corresponding to the following formula:



wherein R_1 is alkyl containing 10 to 22 carbon atoms and may be interrupted by ether oxygen atoms in the vicinity of the NH_2 group, R_2 is alkyl containing seven to 21 carbon atoms, the total number of carbon atoms contained in R_1 and R_2 amounting to from 23 to 39, *n* is either 3 or 4, and Z is either



wherein the polyhydroxyl radicals present in the compounds I and II may be etherified with additional polyhydroxyalkyl radicals. The radical Z may be a glycerylamine or a polyglycerylamine having two to 15 and preferably two to five glyceryl radicals in their molecules. The compounds of Formula I will hereinafter be called "glycerylamides" for the sake of simplicity. The aforesaid softening agent (I) or agents (I and II) can be employed per se or in combination with other conventional laundry agents such as optical brighteners, deacidifiers, disincrusting agents, colorants, perfumes, antimicrobial agents, etc.

The textile-softening agents present in the preparations of the invention consist of from 10 to 100 percent by weight, and preferably to from 20 to 100 percent by weight, of compounds of Formula I, and of from 0 to 90 percent by weight, and preferably of from 0 to 80 percent by weight of compounds of Formula II.

The textiles rinsed with these products have, after drying, not only a high degree of fullness and softness, but they also possess excellent absorbency. Furthermore, the softening agents of the invention are quite compatible with an ionic optical brightening agent. If any of the above-mentioned antimicrobial agents are used, not only are any microbes that might be present in the washed textiles or in the rinse water killed, but in many instances antimicrobial properties are conferred upon the posttreated textiles.

The preparation of the polyglycerylamides is described in U.S. Pat. application Ser. No. 743,595, now abandoned, i.e., by reacting an amine $R_1—NH_2$ wherein R_1 is as defined before with a member selected from the group of polyglycerin-1,2-monochlorhydrin glyceringlycide ethers and polyglycerin glycide ethers and thereafter acylating the resulting secondary amine with a member selected from the group consisting of halides, anhydrides and esters of a carboxylic acid $R_2—COOH$ wherein RR_2 is as defined before.

The polyhydroxylalkyl radicals present in the textile softeners of Formula II can be derived from hexoses, particularly monosaccharides, such as glucose, mannose, galactose, fructose, sorbose, or their mixtures, as for example, invert sugar;

however, they also can be derived from their oligomers such as maltose. The polyhydroxyalkyl radicals can also be derived from pentose, mixtures of various pentoses or mixtures of pentoses and hexoses. The glycamides are of particular practical interest and accordingly this term shall be used hereinafter to designate all of the compounds of Formula II.

The alkyl radicals of the amines from which the textile softeners to be used according to the invention can be prepared can, similar to the radicals of the amidelike bound fatty acids, be saturated or unsaturated, straight chained or branched, and of synthetic or natural origin. Accordingly, the radicals R_1 can be derived from decyl, lauryl, myristyl, cetyl, stearyl, oleyl, arachyl or behenyl amine. The carbon chains of these alkyl radicals can also be interrupted by an ether oxygen atom in the vicinity of the nitrogen atom, preferably between carbon atoms 2 and 3 or 3 and 4 (counting from the nitrogen atom).

The fatty acid radicals R_2—CO— can be derived from capric acid, lauric, myristic, palmitic, stearic, oleic, arachic or behenic acid. Textile softeners can also be used in which the amine radicals and/or the fatty acid radicals are present as isomer mixtures, as they are, for example, in fats and oils of natural origin. Accordingly, the radicals R_1 and R_2—CO— can be derived from the fats and oils of plants, land or marine animals, such as for example, coconut oil, palm oil, linseed oil, cottonseed oil, peanut oil, castor oil, etc., hog lard, tallow or fish or whale oils, or from fractions of the fatty acids contained in these fats. The aforesaid radicals are to be preferably of a substantially saturated nature.

The preparations for use as laundry posttreatment agents according to the invention can be in the form of liquids, pastes or solids (such as powders, flakes, beads and the like), in which the textile softeners are finely divided. The carrier substances or solvents or diluents, as the case may be, are required to be readily soluble in water and more specifically must be capable of rapidly dissolving in the washing medium after the preparation has been added to the rinse water, and so that a dispersion of the finely divided textile softening agents in the rinse water will be obtained in a short time. The concentration as required for use amounts generally to about 0.05 to 2 g./1. and preferably to 0.1 to 0.5 g./1.

The posttreatment agents can be used already in the first rinse, even if the residues of the detergent solution have not as yet been completely rinsed out from the laundry. Since it is an established practice to add the softening agent to the final rinse, the same practice can of course be followed when using the posttreatment agents according to the invention.

After the rinse, the wet laundry can be dried in the conventional manner. The dry laundry is soft and full, and has a pleasant feel, which is readily apparent, particularly in the case of those articles which come in contact with the skin, such as underclothing, bed linens and handkerchiefs. Bath towels in particular show a remarkably good absorbency. Dish towels which have been laundered as above also show this particularly satisfactory absorbency. Further, the damp laundry soft-rinsed according to the invention yields its moisture more rapidly in drying than laundered articles which have not been postrinsed with the preparations according to the invention. Still further, the laundered articles thus treated iron more easily than the same articles not so treated.

The solid carrier substances which are included in the compositions according to the invention are water-soluble inorganic or organic substances having a weakly alkaline, neutral or weakly acid reaction. In the manufacture of solid preparations, there are most advantageously employed inorganic or organic salts, as for example, the alkali salts of sulfuric acid or ortho- or pyrophosphoric acid. Salts of organic acids, however, are also suitable such as for instance the nonsurface active salts of carboxylic acids or oxycarboxylic acids having one to 10 and preferably one to six carbon atoms, such as for example salts of acetic acid, propionic acid, lactic acid, citric acid, tartaric acid, etc. In addition, water-soluble inorganic or organic acid amides or their salts may be employed as solid diluents. These include, for example, amidosulfonic acid salts, amidophosphonic acid salts and water-soluble amides of carboxylic acids, such as urea, acetamide and the like. Solid polyethylene glycols can also be advantageously employed as carrier substances.

The solid posttreatment agents can be prepared, for example, by spraying a solution or dispersion of the textile softener in a suitable liquid onto the finely divided carrier substances present in the solid state. It is also possible, however, to atomized aqueous solutions or suspensions of the textile softeners containing dissolved or dispersed carrier substances, thereby directly obtaining a readily soluble powder or granular product. Still further, solutions or dispersions of the textile softeners in molten urea or in molten polyethylene glycols can be atomized or otherwise converted into readily soluble powder or granular products.

In the preparation of liquid, aqueous concentrates, the textile softeners which are moderately soluble in water are dispersed in an aqueous liquid or in an organic solvent. It is advantageous to first dissolve the textile softeners in a suitable water-soluble organic solvent and to thereafter combine the solutions thus obtained with water, whereupon the solid textile softeners separate in finely divided form, the organic solvent serving as solubilizer. The resultant aqueous dispersions can, of course, contain any of the above-named solid carrier substances in solution, unless the stability of the dispersion be thereby adversely affected. In many cases, however, the stability is even improved. Urea, acetamide and the alkali salts of lower carboxylic acids or oxycarboxylic acids containing up to six carbon atoms are suitable for this purpose. The latter substances can be used in place of or together with water-soluble organic solvents, which then can serve as solubilizers. Soluble salts, of aromatic or alkylaromatic sulfonic acids having six to 10 carbon atoms can also be advantageously used in this connection.

Examples of suitable organic solvents include for example, monovalent or polyvalent alcohols having one to four carbon atoms, or ether alcohols, for instance, the monoethers formed from the aforesaid monovalent alcohols with ethylene glycol, diethylene glycol, propylene glycol, butylene glycol, or the mono- or diethers formed from the aforesaid monovalent alcohols with glycerin. The textile softeners are additionally soluble in water-soluble lower ketones.

In accordance with the invention any of the conventional dispersing and emulsifying agents or emulsion stabilizers can be added for effecting the stabilization of the aqueous dispersions.

Anionic or nonionic surfactants, the action of which is based on the simultaneous presence of a hydrophobic and a hydrophilic radical in their molecule are suitable as dispersing or emulsifying agents. The hydrophobic radical generally consists of an alkyl group having eight to 20 and preferably 12 to 18 carbon atoms. Anionic or nonionic groups are suitable as hydrophilic radicals. As anionic groups there may be mentioned carboxyl, sulfonic acid or sulfuric acid semiester groups, and as nonionic groups polyhydroxyalkyl radicals or polyethylene ether chains. Accordingly, alkylbenzenesulfonates, fatty alcohol sulfates, fatty alcohol glycol ether sulfates having one to five ethylene glycol ether radicals in their molecules, fatty acid monoglycerides, polyethylene glycol ethers of fatty alcohols or alkyl phenols having five to 20 ethylene glycol ether radicals in their molecules are suitable as dispersing and emulsifying agents. The quantity of these surfactants, however, is required to always amount to less than the quantity of the textile softeners, and preferably it is to be substantially less, not exceeding 50 percent and preferably amounting to from 5 to 25 percent of the quantity of the textile softeners.

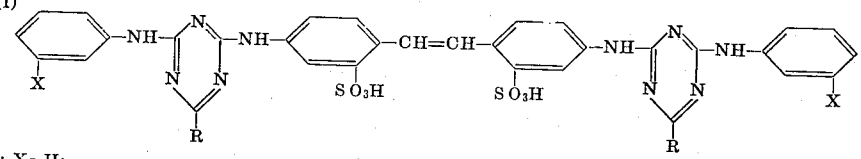
Suitable emulsion stabilizers include the water-soluble colloids, such as the salts of ether carboxylic acids or ether sulfonic acids of cellulose, cellulose sulfate, polyacrylic acid or polymethacrylic acid salts, water-soluble polyacrylamides and polyethylene glycols, preferably those having a molecular weight greater than 600.

Many of these emulsion stabilizers produce a great increase in the viscosity of the aqueous solutions, and therefore they are used in quantities of less than 2 percent and preferably of less than 1 percent so that the posttreatment agents will still be readily flowable or pourable in nature. Others, particularly the polyethylene glycols, can be used in substantially greater quantities, without raising the viscosity to undesirable levels.

The softening agents according to the invention and the compositions containing such softening agents can advantageously be combined with other substances which have heretofore been used as posttreatment agents. These include, for example, optical brighteners, deacidifying and disincrusting agents, colorants, perfumes, heavy metal-free, nonoxidizing antimicrobial agents, etc. These substances can be incorporated into the solid or liquid posttreatment agents according to the invention.

The combined use of the above-described softening agents with optical brighteners is to be considered as an important and novel feature of the invention. The brighteners are intended mainly for cellulose fibers, but brighteners for cellulose and/or other fibers, especially synthetic fibers, can be used as well. For example, the following types of brighteners can be used:

(I)



a: X=H; R=—NH—

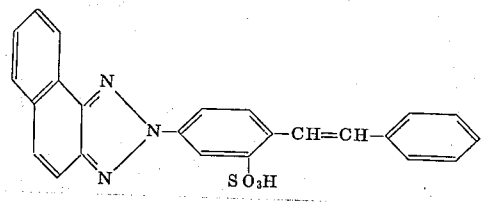
b: X=H; R=—N=(C_2H_5OH)$_2$

c: X=H; R=—N(CH$_3$)(C$_2$H$_5$OH)

d: X=H; R=—N(O)

e: X=S O$_3$H; R=.—N=($_2H_5OH$)$_2$

(II)



Suitable additives for deacidification and/or for the removal of ash or other fiber incrustations include the nonoxidizing acids which have been found to be not harmful to the fibers to be treated and particularly those additives which form soluble alkaline earth salts, and complex compound formers. The acid reacting substances include for example amidosulfuric acid, urea compounds of orthophosphoric acid or solid or liquid organic acid like citric acid. The complex compound formers include for example tripolyphosphates or the higher but still water soluble polyphosphates of alkalies, salts of nitrilotriacetic acid, ethylenediamine tetracetic acid, N-oxyethylethylenediaminetriacetic acid and other conventional organic complex compound forming agents, such as the salts of certain di-, tri- or tetraphosphonic acids.

The term antimicrobial agents as used herein is understood to mean both bactericidal and bacteriostatic, and fungicidal and/or fungistatic products. The antimicrobial agents are required to be water soluble either per se or in the form of their salts. Examples of suitable antimicrobial agents for use herein are formaldehyde, halogenated phenols, nitrated mono- or polyalcohols, and antimicrobial surfactants. If the antimicrobial agents are zwitter-ionic surfactants, their quantity is required to be less than the quantity of the textile-softening agent and preferably the quantity of zwitter-ionic surface-active antimicrobial agent amounts to no more than 50 percent of the quantity of the textile softening agent.

As instances of halogenated phenols which may be used as antimicrobials, there may be mentioned, for example, chlorination and bromination products of phenol, such as pentachlorophenol, and also halogenated cresols, xylenols, such as 4-bromo-3,5-xylenol or halogenated cyclohexylphenols, methylcyclohexylphenols or benzylphenols.

There may also be used the water-soluble antimicrobial substances of the cationic or hybrid (zwitter) ionic surfactant type, which serve in the final posttreatment agents also as dispersing agents.

Instances of cationic substances which are suitable as antimicrobials include quaternary ammonium compounds which contain on the nitrogen atom thereof an aliphatic hydrocarbon radical containing eight to 18, and preferably 10 to 14 carbon atoms, or alternatively contain on the nitrogen atom at least one aromatic radical or a radical having double bonds, the latter radical being linked to the nitrogen atom by an aliphatic carbon atom. The following are instances of the cationic compounds suitable for use in the invention include: diethylbenzyldodecyl ammonium chloride, diethylbenzyloctyl ammonium chloride, and dibutylallyl, methylethylbenzyl, ethylcyclohexylallyl and ethylcrotyldiethylaminoethyl dodecyl ammonium chloride.

There are also tertiary amines suitable for use which can be prepared by condensing a primary or secondary amine containing up to four basic nitrogen atoms and one aliphatic or alkylaromatic radical having eight to 18 and preferably eight to 14 aliphatic carbon atoms with a phenol or lower aliphatic aldehyde, preferably formaldehyde or acetaldehyde. The phenol employed in the condensation reaction may have in its molecule a plurality of sites capable of condensation, and these may be substituted with lower alkyl, alkoxy or benzyl radicals containing up to 4 carbon atoms. The phenol, alkyl, alkoxy and benzyl radicals may additionally be substituted with chlorine or bromine atoms and/or with nitro groups. Examples of such condensation products include, for instance, the following compounds: oxybenzyloctylamine, oxybenzyldodecyldiethylenetriamine, (2-oxy-5-chloro-6-methylbenzyl)-dodecyldiethylenetriamine, (2-oxy-5-methyl-benzyl)-octyldiethyl-enetriamine, (2-oxy-5-chloro-4,6-dimethylbenzyl)-octyldiethylene-triamine, (tris-oxybenzyl)-dodecyltriethylenetriamine, o,o-bis-(tetradecylaminomethyl)-phenol, (octyl-diethylenetriaminomethyl)-p-cresol, o,o-bis-(dodecyldiethylenetriaminomethyl)-p-chloro-m-cresol, m,m-bis(dodecyldiethylenetriaminomethyl)-p-oxybenzoic acid, 2,2-bis-p-oxy-m,m-di-(dodecyldiethylenetriaminomethyl)-

phenolpropane, o,o-bis-(dodecyldiethylenetriaminomethyl)-p-nitrophenol, o,o-bis-(dodecylpropylenediaminomethyl)-p-chloro-m,m-dimethylphenol, etc. The aforesaid tertiary amine compounds have a weakly acid reacting hydroxyl group and thus represent an intermediate type between the purely cationic and the hybrid (zwitter)-ionic surfactants.

The hybrid or zwitter ionic surfactants which have achieved particular importance as antimicrobials include compounds of the aminocarboxylic acid, polyaminocarboxylic acid and betaine type.

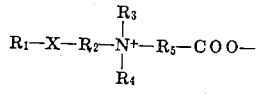
Illustrative of the aminocarboxylic and polyaminocarboxylic acid antimicrobial agents are compounds having the following structural formula:

$$R_1—NH—(R_2—NH)_x—R_3—COOH$$

wherein R_1 represents an alkyl or alkylaryl radical of high molecular weight, preferably such a hydrocarbon radical having six to 18 and most preferably eight to 14 aliphatic carbon atoms, R_2 represents an ethylene or propylene radical, x represents a whole number of from one to six and R_3 represents an aliphatic-aromatic or aromatic bridge having one to six carbon atoms. The following compounds are illustrative of aminocarboxylic and polyaminocarboxylic compounds having the above-mentioned formula: dodecylaminopropylglycine, tetradecylaminoethyl-β-alanine, dodecyl-di-(aminoethyl)-glycine, dodecylaminoisopropylaminomethylsalicyclic acid, hexadecyl-tri-(aminoethyl)-β-aminobutyric acid, dodecylbenzylaminopropyl-β-alanine, octylphenoxyethyl-di-(aminoethyl)-glycine, dodecylaminoethylphenylalanine, dodecylaminoethylaminobenzoic acid, etc.

The radical R_1 can also be interrupted by an ether oxygen atom, as is the case, for example, in the following compounds: dodecyloxypropylaminopropionic acid, lauryl-1,3-oxypropyl-β-aminobutyric acid, C_{12-14}-alkyloxyethylaminoacetic acid, dodecyl-1,2-oxypropylaminomethylsalicylic acid, octylphenoxyethylaminobenzoic acid.

The compounds that can be used according to the invention furthermore include carboxybetaines of the formula:



which can be used both in the betaine form, i.e., in the form of inner salts, and in the form of acidic or basic salts. R_1 has the same meaning as in the preceding formula, R_2 represents an ethylene or propylene group, and R_3 and R_4 represent aliphatic radicals of low molecular weight, R_5 represents an aliphatic bridge of low molecular weight, X an ether oxygen atom or the —CONH— group. Examples of such carboxybetaine compounds are lauryl-1,3-amidopropyldimethyl-aminoacetic acid, lauryloxyethyl-di-(hydroxyethyl)-aminoacetic acid, etc.

If the posttreatment agents according to the invention are in the form of solid products, they advantageously have the following composition:

70–5%, preferably 30–10%, by weight, textile softeners

30–95%, preferably 70–90%, by weight, solid carrier substance

0–20%, preferably 1–15%, by weight, optical brighteners, most preferably a quantity amounting to from 5 to 25% of the quantity of the textile softener used.

0–30%, preferably 1–15%, by weight, surface active dispersing or emulsifying agents, although the quantity thereof must always be less than the quantity of the textile softener, preferably no more than **50%**, and most preferably 5 to 25% of the quantity of the textile softener.

0–2%, preferably 0.1–10%, by weight, emulsion stabilizers or thickening agents, the quantity, however, not exceeding an amount whereby a 10% aqueous solution or dispersion of the entire solid preparation will still be a free-flowing liquid.

And, if desired,

0.5–20%, preferably 1–20%, by weight, of the above-named antimicrobial agents; wherein if these agents are antimicrobial, zwitter-ionic surfactants, their quantity is always to be smaller than the quantity of textile softener, amounting preferably to no more than 50%, and most preferably to 5 to 25%, of the quantity of the textile softener.

If the post-treatment agents according to the invention are in the form of liquid preparations, they advantageously have the following composition:

2–30%, preferably 5–15%, by weight, textile softeners

0–50%, preferably 5–30% by weight, solid water-soluble hydrotropic substance and/or water-soluble organic solvent.

0–10%, preferably 0–5%, by weight, surface active emulsifying or dispersing agent, this quantity always to be smaller than the quantity of the textile softener, and preferably amounting to no more than **50%**, and most preferably to 5 to 25%, by weight, of the quantity thereof.

0–10%, preferably 1–8%, by weight, optical brighteners, most preferably a quantity as to amount to 5 to 25% of the quantity of the textile softener.

0–20%, preferably 0.1–10%, by weight, water-soluble emulsion stabilizer or thickening agent, but not to exceed an amount whereby the preparation is no longer an easy-flowing liquid.

and, if desired:

0.5–30%, preferably 1–20%, by weight, of the above-named antimicrobial agents; and if they are antimicrobial zwitter-ionic surfactants, their quantity is always to be less than the quantity of the textile softener, preferably no more than 50% and most preferably to 5 to 25% of the quantity thereof.

Remainder water and/or water-soluble organic solvent.

To illustrate the manner in which the invention may be carried out, the following Examples are given. It is to be understood, however, that the Examples showing products of the invention are for the purpose of illustration and the invention is not to be regarded as limited to any of the specific materials or conditions recited therein.

The Examples described a number of liquid laundry post-treatment agents. The polyglycerylamide derivative has three —CH_2—CHOH—CH_2O— radicals per molecule. The ethoxylated dimethyl polysiloxane incorporated into a number of preparations as an emulsifier is marketed by Wackerchemie GmbH, Munich, under the trade name "DC 202."

All percentages are percentages by weight.

EXAMPLE 1

5% glucamide

R_1=C_{16}–C_{18} mixture of tallow fatty acid, average approximately C_{17}

R_2=C_{11}–C_{17} mixture of coconut fatty acid, average approximately C_{13}

5% dihydroxypropylamide

R_1=C_{18}–H_{37}

R_2=C_{11}–H_{23} Total 29 carbon atoms.

30% ethylene glycol monoethyl ether

2% nonylphenol plus 9.5 ethoxyl

58% water

EXAMPLE 2

5% glucamide R_1=$C_{16}H_{33}$ R_2=$C_{11}H_{23}$

5% dihydroxypropylamide as described in Example 1

30% ethylglycol monoethylether

2% nonylphenol plus 9.5 ethoxyl

58% water

EXAMPLE 3

10% polyglyceryl amide

R_1=C_{12}–C_{18} mixture of coconut fatty acid, average approximately C_{13}

R_2=C_{15}–C_{17} mixture of tallow fatty acid, average approximately C_{16}
Combined total approximately 29 carbon atoms.
20% ethylene glycol monoethylether
4% nonylphenol plus 9.5 ethoxyl
66% water

EXAMPLE 4

10% dihydroxypropylamide
R_1=C_{16}–C_{18} mixture of tallow fatty acid, average approximately C_{17}
R_2=C_{15}–C_{17} mixture of tallow fatty acid, average approximately C_{16}
Combined total approximately 29 carbon atoms.
30% ethylene glycol monoethyl ether
2% alkylphenol plus 9.5 ethoxyl
58% water

EXAMPLE 5

8% glucamide $R_1 = C_3H_6OC_{16}H_{33}$ R_2=$C_{15}H_{31}$
Total 34 carbon atoms
2% dihydroxypropylamide
R_1=C_{16}–C_{18} mixture of tallow fatty acid, average approximately C_{17}
R_2=C_{11}–C_{17} mixture of coconut fatty acid, average approximately C_{13}
Total approximately 30 carbon atoms
90% isopropanol.

EXAMPLE 6

5% glucamide $R_1 = C_{12}H_{25}$ $R_2 = C_{17}H_{35}$
Total 29 carbon atoms
5% dihydroxypropylamide as described in Example 5
90% isopropanol.

EXAMPLE 7

10% dihydroxypropylamide $R_1 = C_{18}H_{37}$ $R_2 = C_{11}H_{23}$
Total 27 carbon atoms
60% isopropanol
2% ethoxylated dimethylpolysiloxane
28% water

EXAMPLE 8

5% glucamide
R_1=C_{12}–C_{18} mixture of coconut fatty acid, average approximately C_{13}
R_2=C_{15}–C_{17} mixture of tallow fatty acid, average approximately C_{17}
Total approximately 29 carbon atoms
5% dihydroxypropylamide
R_1=C_{12}–C_{18} mixture of coconut fatty acid, average approximately C_{13}
R_2=C_{15}–C_{17} mixture of tallow fatty acid, average approximately C_{13}
Total approximately 29 carbon atoms
30% ethylene glycol monomethyl ether
10% tartaric acid
2% ethoxylated dimethylpolysiloxane
48% water

EXAMPLE 9

5% glucamide as described in Example 1
5% dihydroxypropylamide as described in Example 8
30% ethylene glycol monoethyl ether
10% tartaric acid
2% alkyl phenol plus 9.5 ethoxyl
48% water

EXAMPLE 10

10% dihydroxypropylamide as described in Example 4
30% ethylene glycol monomethyl ether
2% ethoxylated dimethyl polysiloxane
10% tartaric acid
48% water

EXAMPLE 11

10% polyglycerylamide as described in Example 3
30% ethylene glycol monoethyl ether
2% ethoxylated dimethyl polysiloxane
10% gluconic acid
48% water

EXAMPLE 12

10% dihydroxypropylamide as described in Example 7
30% isopropanol
2% nonylphenol plus 9.5 ethoxyl
10% amidosulfonic acid
48% water

EXAMPLE 13

10% dihydroxypropylamide $R_1 = C_{14}H_{29}$ $R_2 = C_{15}H_{31}$
Total 29 carbon atoms
40% ethylene glycol monoethyl ether
2% nonylphenol plus 9.5 ethoxyl
1% brightening agent as described on page 26
47% water

EXAMPLE 14

5% glucamide as described in Example 5
5% dihydroxypropylamide as described in Example 8
2% N-dodecyl-N-benzyl-N-N,N-dimethylammonium chloride
88% isopropanol

EXAMPLE 15

5% glucamide as described in Example 8
5% dihydroxypropylamide as described in Example 8
30% ethylene glycol monoethyl ether
2% nonylphenol plus 9.5 ethoxyl
2% N-dodecyl-N-benzyl-N-N,N-dimethylammonium chloride
10% citric acid
46% water

The preparations corresponding to Examples 1 to 4, 8 to 13, and 15, are in the form of dispersions, and the preparations according to Examples 5 to 7 and 14 are in the form of clear solutions.

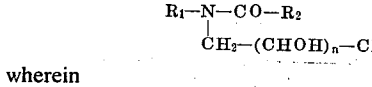
A number of experiments were carried out using ordinary cotton fabrics or cotton terry cloth in which the fabric samples were eashed in a drum-type washing machine using a conventional commercially available controlled-suds detergent and temperatures of up to 95° C. In the final rinse, one of the preparations described in the Examples was added in a quantity sufficient to provide a concentration of 0.3 grams of the textile softeners per liter of washing medium. The dried cotton fabrics all had a soft feel and excellent absorbency.

We claim:

1. A composition for softening laundered textiles consisting essentially of

(I)

and



(II)

wherein
R_1 is
1. alkyl of 10 to 22 carbon atoms, or
2. alkyl of 10 to 22 carbon atoms with an ether oxygen linkage in the vicinity of the nitrogen atom,
R_2 is alkyl of seven to 21 carbon atoms,
R_1+R_2 have 23 to 39 carbon atoms,
Z is
(1) H_2C–CHOH–CH_2OH
(2) CH_2OH–CH–CH_2OH, or
3. an ether of (1) or (2) with 1 to 14 additional glyceryl radicals, and *n* is 3 or 4, (II) being present to the extent of about 50 to 90 percent by weight of (I) and (II).

2. A composition according to claim 1, wherein (I) and (II) constitute about 2–30 weight percent, said composition in-

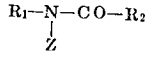
cluding a solvent selected from the group consisting of water, a water-soluble organic solvent and a mixture of water and water-soluble organic solvent, said water-soluble organic solvent being selected from the group consisting of unsubstituted aliphatic monohydric alcohols of one to four carbon atoms, ether alcohols formed by the reaction of said aliphatic alcohols with a glycol selected from the group consisting of ethylene glycol, propylene glycol, butylene glycol and diethylene glycol, water-soluble lower ketones and monoethers and diethers formed by reacting said unsubstituted aliphatic monohydric alcohols with glycerine.

3. A composition according to claim 2, wherein (I) and (II) constitute about 5–15 weight percent, wherein R_1 has 12 to 20 carbon atoms, wherein R_2 has 11 to 19 carbon atoms, and wherein R_1+R_2 have a total of 27 to 35 carbon atoms.

4. A composition according to claim 1, wherein (I) and (II) constitute about 5–70 weight percent, and about 30–95 weight percent of solid carrier substance selected from the group consisting of salts of sulfuric acid, phosphoric acids, or aliphatic carboxylic acids containing up to about 10 carbon atoms, urea, acetamide and polyethylene glycols.

5. A composition according to claim 1, including 0.5–20 weight percent of a heavy metal-free, nonoxidizing water-soluble antimicrobial agent.

6. A method for treating a textile-fabric article comprising laundering said article, and thereafter rinsing said article with water containing dissolved therein in the range of 0.05 to 2 grams per liter of a compound of the formula



(I)

wherein:

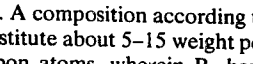
R_1 is

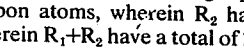
1. alkyl of 10 to 22 carbon atoms, or
2. alkyl of 10 to 22 carbon atoms with an ether oxygen linkage between either the 2 and 3 or 3 and 4 carbon atoms from the nitrogen atom,

R_2 is alkyl of seven to 21 carbon atoms,

R_1+R_2 have 23 to 39 carbons atoms, and

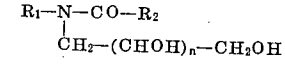
Z is

(1) 

(2) 

3. an ether of (1) or (2) with one to 14 additional glyceryl radicals.

7. A method according to claim 6 wherein the rinse water also has dissolved therein a compound of the formula



(II)

wherein R_1, R_2 have the same meanings as in claim 6 and n is 3 or 4, the compound (II) being present to the extent of about 50 to 90% by weight of (I) and (II).

8. A method according to claim 7, wherein R_1 has 12 to 20 carbon atoms, wherein R_2 has 11 to 19 carbon atoms, and wherein R_1+R_2 have a total of 27 to 35 carbon atoms.

* * * * *