SOFTENING AGENT COMPOSITIONS

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References Cited
UNITED STATES PATENTS

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Abstract

Liquid or powdery softening agent compositions comprising a combination of (1) a 3-acyloxy-2-hydroxypropyl-tri-alkylammonium compound of the formula

\[
\text{R}_1 \text{OH} \quad \frac{\text{CHOH}}{\text{CH}_2-\text{CH}-\text{CH}_2-O-N-\text{R}_2 \quad \text{X}^-} \\
\text{CO-O-CH}_2-\text{CH}_2-\text{CH}_2-N-\text{R}_2 \quad \text{X}^- \\
\text{CB}_2 \quad \text{CO-O-A}
\]

wherein \(m\) and \(n\) are integers from 0 to 4 and the sum of \(m + n\) is an integer from 0 to 4, \(R_1\) and \(R_2\) are selected from the group consisting of alkyl and alkenyl having from 10 to 24 carbon atoms, \(R_3\) is alkyl having 1 to 4 carbon atoms, A is selected from the group consisting of hydrogen and

\[
\text{OH} \quad \frac{\text{CHOH}}{\text{CH}_2-\text{CH}-\text{CH}_2-O-N-\text{R}_2 \quad \text{X}^-} \\
\text{CO-O-CH}_2-\text{CH}_2-\text{CH}_2-N-\text{R}_2 \quad \text{X}^- \\
\text{CB}_2 \quad \text{CO-O-A}
\]

\(B\) is selected from the group consisting of hydrogen and, when \(m = 0\) and \(n = 1\), methyl and ethyl, \(X^-\) is an anion, (2) a non-ionic dispersing agent, (3) at least one diluent selected from the group consisting of water, and water-soluble or readily water-dispersible liquid or solid carriers, and (4) optionally other customary ingredients of softening agent compositions, as well as the process of softening washed textiles employing from 0.1 to 2.0 gm/l of the above softening rinsing agent compositions.

10 Claims, No Drawings
SOFTENING AGENT COMPOSITIONS

THE PRIOR ART

After the drying of washed textiles, particularly those of cotton or similar cellulose fibers, a distinct hardening or harshening of the handle or hand can be observed. This phenomenon is particularly exhibited if the textiles have been washed in drug-washing machines with a strong mechanical agitation. This undesirable hardening of the textile goods can be avoided, as is well-known, when a softening rinsing agent is added to the last rinsing liquor of the washing process, that conventionally contains cationic compounds with at least two longer-chain alkyl radicals in the molecule. There are liquid softening rinsing agents for laundry on the market which contain as active ingredient distearyl-dimethylammonium chloride, in an aqueous dispersion. It is known, however, that such cationic softening rinsing agents adversely affect the absorptivity of the treated laundry, even when the instructions for use are followed exactly.

OBJECTS OF THE INVENTION

An object of the present invention is the obtaining of softening agent compositions which effectively soften washed textiles without an adverse effect on the absorptivity of the treated laundry.

Another object of the present invention is the obtaining of a liquid or powdery softening agent composition for washed textiles consisting essentially of

- a. from 1 to 50% by weight of a 3-acyloxy-2-hydroxypropyl-trialkylammonium compound of the formula

\[
\begin{align*}
\text{CO} & \quad \text{O} \quad \text{CH}_2 \quad \text{CH} \quad \text{CH} \quad \text{N} \quad \text{R}_1 \quad \text{R}_2 \quad \text{X}^- \\
\text{(CHOH)}_m & \quad \text{(C}_2\text{H}_5)_n \quad \text{CO} \quad \text{O} \quad \text{A}
\end{align*}
\]

wherein \( m \) and \( n \) are integers from 0 to 4 and the sum of \( m + n \) is an integer from 0 to 4, \( R_1 \) and \( R_2 \) are selected from the group consisting of alkyl and alkenyl having from 10 to 24 carbon atoms, \( R_3 \) is alkyl having 1 to 4 carbon atoms, \( A \) is selected from the group consisting of hydrogen and

\[
\begin{align*}
\text{CH}_2 & \quad \text{CH} \quad \text{CH}_2 \quad \text{N} \quad \text{R}_1 \quad \text{R}_2 \quad \text{X}^- \\
\text{(CHOH)}_m & \quad \text{(C}_2\text{H}_5)_n \quad \text{CO} \quad \text{O} \quad \text{A}
\end{align*}
\]

B is selected from the group consisting of hydrogen and, when \( m = 0 \) and \( n = 1 \), methyl and ethyl, and \( X^- \) is an anion selected from the group consisting of halide and the anion of an organic non-surface-active acid having 2 to 8 carbon atoms,

- b. from 0.2 to 10% by weight of at least one non-ionic surface-active dispersing agent selected from the group consisting of a water-soluble dispersing agent and a water-dispersible dispersing agent,

- c. from 0 to 25% by weight of other customary ingredients of softening agents for washed laundry, and

- d. the remainder up to 100% by weight of at least one diluent selected from the group consisting of water, and

water-soluble or readily water-dispersible liquid and solid carriers.

A further object of the invention is the development of a process for the softening of washed textiles which consists of rinsing said washed textiles with water containing from 0.1 to 2.0 g/l of the above 3-acyloxy-2-hydroxypropyl-trialkylammonium compounds.

A still further object of the invention is the obtaining of powdery softening agent compositions for washed textiles containing (a) from 1 to 50% by weight of the above 3-acyloxy-2-hydroxypropyl-trialkylammonium compounds, (b) from 0.2 to 10% by weight of at least one nonionic surface-active dispersing agent, (c) from 0 to 25% by weight of other customary ingredients of softening agents for washed laundry and (d) the remainder up to 100% by weight of at least one diluent carrier compatible with rinsing agents for washed laundry, where said trialkylammonium compound is present in said composition a) in a homogenous mixture with the other components or b) in a finely-divided form on the surface of said at least one solid diluent carrier, and where the particles according to a) and b) may be combined as agglomerates.

These and other objects of the invention will become more apparent as the description thereof proceeds.

DESCRIPTION OF THE INVENTION

It has now been found that these disadvantages of the prior art may be avoided and the object of the invention achieved if the washed laundry, after rinsing out the washing liquor, is treated with a washing after-treatment agent comprising a combination of (1) a 3-acyloxy-2-hydroxypropyl-tri-alkylammonium compound of the formula

\[
\begin{align*}
\text{CO} & \quad \text{O} \quad \text{CH}_2 \quad \text{CH} \quad \text{CH} \quad \text{N} \quad \text{R}_1 \quad \text{R}_2 \quad \text{X}^- \\
\text{(CHOH)}_m & \quad \text{(C}_2\text{H}_5)_n \quad \text{CO} \quad \text{O} \quad \text{A}
\end{align*}
\]

wherein \( m \) and \( n \) are integers from 0 to 4 and the sum of \( m + n \) is an integer from 0 to 4, \( R_1 \) and \( R_2 \) are selected from the group consisting of alkyl and alkenyl having from 10 to 24 carbon atoms, \( R_3 \) is alkyl having 1 to 4 carbon atoms, \( A \) is selected from the group consisting of hydrogen and

\[
\begin{align*}
\text{CH}_2 & \quad \text{CH} \quad \text{CH}_2 \quad \text{N} \quad \text{R}_1 \quad \text{R}_2 \quad \text{X}^- \\
\text{(CHOH)}_m & \quad \text{(C}_2\text{H}_5)_n \quad \text{CO} \quad \text{O} \quad \text{A}
\end{align*}
\]

B is selected from the group consisting of hydrogen and, when \( m = 0 \) and \( n = 1 \), methyl and ethyl, and \( X^- \) is an anion, (2) a non-ionic dispersing agent, (3) at least one diluent selected from the group consisting of water, and water-soluble or readily water-dispersible liquid or solid carriers, and (4) optionally other customary ingredients of softening agent compositions.

Preferably the present invention comprises a liquid or powdery softening agent composition for washed textiles consisting essentially of...
a. from 1% to 50% by weight of a 3-acyloxy-2-hydroxypropyl-trialkylammonium compound of the formula

\[
\begin{align*}
\text{CO} & - \text{O} - \text{CH}_2 - \text{CH} - \text{CH}_2 - N - \text{R}_3 - \text{X}^- \\
& \quad + \text{R}_2 \\
\text{CHOH} & \\
\text{CB} & \\
\text{CO} & - \text{O} - \text{A}
\end{align*}
\]

wherein \( m \) and \( n \) are integers from 0 to 4 and the sum of \( m + n \) is an integer from 0 to 4. \( \text{R}_1 \) and \( \text{R}_2 \) are selected from the group consisting of alkyl and alkenyl having from 10 to 24 carbon atoms, \( \text{R}_3 \) is alkyl having 1 to 4 carbon atoms, and \( \text{A} \) is selected from the group consisting of hydroxyl and

B is selected from the group consisting of hydrogen and, when \( n = 0 \) and \( n = 1 \), methyl and ethyl, and \( \text{X}^- \) is an anion selected from the group consisting of halide and the anion of an organic non-surface-active acid having 2 to 8 carbon atoms.

b. from 0.2 to 10% by weight of at least one non-ionic surface-active dispersing agent selected from the group consisting of a water-soluble dispersing agent and a water-dispersible dispersing agent,

c. from 0 to 25% by weight of other customary ingredients of softening agents for washed laundry, and

d. the remainder up to 100% by weight of at least one diluent selected from the group consisting of water, and water-soluble or readily water-dispersible liquid and solid carriers.

In the formula, the alkyl and alkenyl groups are preferably straight-chained groups, preferably straight-chained alkyl, which may be of natural or synthetic origin, for example, dodecyl, tetradecyl, hexadecyl, oleyl and octadecyl, are preferably represented by the substituents \( \text{R}_1 \) and \( \text{R}_2 \). The substituent \( \text{R}_3 \) preferably signifies the methyl residue.

As is further mentioned below, because of the method of preparation of the compounds of the formula, the anion \( \text{X}^- \) is preferably a chloride or bromide anion.

The further treatment of the laundry may be effected in various ways depending on the drying process, which is to be used. If the drying is carried out in a hot air drier, the washed laundry can be directly sprayed with a dispersion of the active substance or the latter may be brought into contact with the washed laundry by way of a carrier, for example by spraying the inside walls of the drier with the dispersion of active substance before the drier is charged with the wash or by the addition to the charge of a carrier of large surface area saturated with the dispersion of active substance, whereby the textile softener is absorbed on the washed goods during the drying process. At the present time, however, the washing is generally hung out to dry, therefore the application of the softener in the last rinsing bath in a drying process when done by hand, and especially by machine washing, is most commonly used. Of course, this procedure can be followed where the wash is dried in a drier also. In the last-mentioned application, the 3-acyloxy-2-hydroxypropyl-trialkylammonium compound is preferably used in the rinsing bath in amounts from 0.1 to 2.0 gm/liter, especially from 0.2 to 1.0 gm/liter.

In addition, other substances may be present in the rinsing bath, which substances are usable for the after-treatment of washed laundry, such as optical brighteners, anti-microbial active agents, sequestering agents, perfumes and dyes, etc. At least part of these substances should be acidic, and the amount of the acidic substances, particularly of the sequestering agents is selected so that the rinsing bath has a neutral to weakly acidic pH range.

Suitable liquid carriers are water and water-soluble organic solvents from the group of lower alcohols containing 1 to 5 carbon atoms, preferably alkanols having 1 to 5 carbon atoms, for example, methanol, ethanol, propanol, isopropyl alcohol, butanol, amyl alcohol, lower ketones, preferably alkanones having 3 to 6 carbon atoms, such as acetone and methyl ethyl ketone and the ethylene and diethylene glycols and their mono- or di-ethyl, or monoethyl or diethyl ethers, as well as mixtures of the same with water.

Water and isopropyl alcohol-water mixtures are of special practical interest.

Solid carriers which may be used are readily water-soluble or water-dispersible inert organic or organic compounds from the group comprising urea, acetamide, biuret, sodium sulfate, solid polyethylene glycols and, optionally, solid forms of the below listed acid additives and acid sequestering agents.

The other components of the after-treatment agents according to the invention consist essentially of optical brighteners, antimicrobial active agents, acid additives, or sequestering agents, perfumes and dyestuffs.

The liquid and solid agents according to the invention are distinguished by a good dispersibility in cold water. With the treatment of washed laundry by the softening agents for the laundry of the invention, fabrics hardened by washing, particularly cotton, become soft and nappy. Such treated fabrics possess, in comparison to the untreated washing goods, only a slightly diminished absorptivity and in comparison to the washing goods treated with a known cationic softeners, a substantially improved absorptivity. In addition, by the treatment with the agents, according to the invention, an undesirable static charging of the textiles particularly those of synthetic fibers, is largely prevented.

The 3-acyloxy-2-hydroxypropyl-trialkylammonium compounds of the above formula are preferably prepared by reacting (1) a dicarboxylic acid of the formula 1a

\[
\text{HOOC} - (\text{CHOH})_m - (\text{CB})_n - \text{COOH}
\]

and (2) a tertiary amine of the formula 1b

\[
N - \text{R}_3 \\
\text{R}_1
\]
wherein \( m, n, B, R, R_0 \) and \( R_0 \) have the above definitions, with (3) an epihaloalcohol such as epichlorohydrin or epibromohydrin, preferably in the presence of an inert organic solvent, and in order to prevent formation of by-products, the tertiary amine is preferably used in slightly less than the theoretical amount with respect to the epihaloalcohol. In order to obtain the lightest colored product possible, a reaction temperature of from 60°C to 90°C is preferred. A practically quantitative reaction generally results after a reaction of 25 hours under these conditions. The desired products are obtained after distilling off the solvents and any unreacted starting compounds, and they may generally be used in this form. In some cases a purification by redissolution or recrystallization, for example, in lower alkanols, acetone, ethyl acetate, gasoline, with active charcoal or other adsorbents, is advisable. The following 3-aclyloxy-2-hydroxypropyl-trialkylammonium compounds given in Table I are some of the active substances utilizable according to the invention.

**TABLE I**

<table>
<thead>
<tr>
<th>No.</th>
<th>Formula</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3-Oxaloxy-2-hydroxypropyl-methylididodecylammonium chloride, ( m = n = 0, A = H, R_1 = R_2 = \text{dodecyl}, R_0 = \text{methyl}, X = Cl )</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3-Oxaloxy-2-hydroxypropyl-methylditetradecylammonium chloride</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3-Oxaloxy-2-hydroxypropyl-methylhexadecylammonium chloride</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3-Oxaloxy-2-hydroxypropyl-methylhexadecylammonium chloride</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3-Malonxy-2-hydroxypropyl-methylididecylammonium chloride, ( m = 0, n = 1, A = H, R_1 = R_2 = \text{dodecyl}, R_0 = \text{methyl}, X = Cl )</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3-Malonxy-2-hydroxypropyl-methylditetradecylammonium chloride</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3-Malonxy-2-hydroxypropyl-methylditetradecylammonium chloride</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>3-Succinox-2-hydroxypropyl-methylididodecylammonium chloride, ( m = 0, n = 2, A = H, R_1 = R_2 = \text{dodecyl}, R_0 = \text{methyl}, X = Cl )</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3-Succinox-2-hydroxypropyl-methylditetradecylammonium chloride</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3-Glutarox-2-hydroxypropyl-methylhexadecylammonium chloride, ( m = 0, n = 3, A = H, R_1 = R_2 = \text{hexadecyl}, R_0 = \text{methyl}, X = Cl )</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>3-Adipoxy-2-hydroxypropyl-methylididecylammonium chloride</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>3,3'-Oxalyldioxy-bis(2-hydroxypropyl-methylididodecylammonium chloride), ( m = n = 0, A = \text{ester group}, R_1 = R_2 = \text{dodecyl}, R_0 = \text{methyl}, X = Cl )</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>3,3'-Oxalyldioxy-bis(2-hydroxypropyl-methylididecylammonium chloride)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>3,3'-Oxalyldioxy-bis(2-hydroxypropyl-methylididecylammonium chloride)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>3,3'-Oxalyldioxy-bis(2-hydroxypropyl-methylididecylammonium chloride)</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3-Malonxydioxy-bis(2-hydroxypropyl-methylididecylammonium chloride)</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>3,3'-Succinylidioxy-bis(2-hydroxypropyl-methylididecylammonium chloride)</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>3,3'-Diethylmalidioxy-bis(2-hydroxypropyl-methylididecylammonium chloride), ( m = n = 1, A = \text{ester group, } B = \text{C}_4H_9, R_1 = R_2 = \text{octadecyl}, R_0 = \text{methyl}, X = Cl )</td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 1-Continued**

<table>
<thead>
<tr>
<th>No.</th>
<th>Formula</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>3,3'-Adipoxydioxy-bis(2-hydroxypropyl-methylididecylammonium chloride)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>3-Tartarox-2-hydroxypropyl-methylididodecylammonium chloride, ( m = 1, n = 0, A = H, R_1 = R_2 = \text{dodecyl}, R_0 = \text{methyl}, X = Cl )</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>3-Malonxy-2-hydroxypropyl-methylididodecylammonium chloride, ( m = 1, n = 0, A = H, R_1 = R_2 = \text{dodecyl}, R_0 = \text{methyl}, X = Cl )</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>3-Malonxy-2-hydroxypropyl-methylditetradecylammonium chloride</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>3-Tartarox-2-hydroxypropyl-methylididodecylammonium chloride, ( m = 2, n = 0, A = H, R_1 = R_2 = \text{dodecyl}, R_0 = \text{methyl}, X = Cl )</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>3,3'-Tartaroxdioxy-bis(2-hydroxypropyl-methylididecylammonium chloride)</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>3,3'-Maldehyoxy-bis(2-hydroxypropyl-methylididodecylammonium chloride)</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>3,3'-Maldehyoxy-bis(2-hydroxypropyl-methylididodecylammonium chloride)</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>3,3'-Tartaryldioxy-bis(2-hydroxypropyl-methylididecylammonium chloride)</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>3,3'-Tartaryldioxy-bis(2-hydroxypropyl-methylididecylammonium chloride)</td>
<td></td>
</tr>
</tbody>
</table>

The composition of particularly interesting liquid washing after-treatment agents for laundry, according to the invention, can lie within the following recipe:

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>100%</td>
</tr>
<tr>
<td>2.0% to 20.0% preferably 5.0% to 15.0% by weight of the active 3-aclyloxy-2-hydroxypropyl-trialkylammonium compounds, preferably 0.5% to 3.0% by weight of non-ionic dispersing agents, preferably 1.0% to 15.0% by weight of water-soluble organic solvents, preferably 0.3% to 7.5% by weight of other conventional ingredients of washing after-treatment agents for laundry.</td>
<td>0.2% to 3.0% by weight of antimicrobial active material, preferably 0.2% to 6.0% by weight of an acidic additive, preferably 0.01% to 0.5% by weight of cotton brighteners, preferably 0.01% to 0.5% by weight of polyamide brighteners, preferably 0.01% to 0.5% by weight of perfumes, preferably 0.0001% to 0.5% by weight of dyes.</td>
</tr>
</tbody>
</table>

As other conventional ingredients of liquid after-treatment agents for laundry at least one of the following components may be present in the stated amount, based on the total agent composition:

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1% to 50% preferably 5% to 25% by weight of the above 3-aclyloxy-2-hydroxypropyl-trialkylammonium compounds, preferably 1% to 6% by weight of non-ionic dispersing agents, preferably 0.3% to 15% by weight of other customary ingredients of washing after-treatment agents for laundry</td>
<td>0.2% to 10%</td>
</tr>
</tbody>
</table>
Remainder, solid carriers from the group of urea, acetamide, biuret, sodium sulfate, solid polyethylene glycolds.

Of the other customary ingredients of solid washing after-treatment agents for laundry at least one of the following components may be present, in the stated amount, based on the whole composition:

<table>
<thead>
<tr>
<th>Amount</th>
<th>Component Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>from 0.2% to 5.0%</td>
<td>by weight of antimicrobial active substance</td>
</tr>
<tr>
<td>from 0.1% to 10.0%</td>
<td>by weight of an acid additive, brighteners</td>
</tr>
<tr>
<td>from 0.01% to 0.8%</td>
<td>by weight of cotton, polyamide, perfume, dye</td>
</tr>
<tr>
<td>from 0.0001% to 0.08%</td>
<td>by weight of perfume, dye</td>
</tr>
</tbody>
</table>

The powdery agents of the invention are utilized in such amounts that the concentration of the textile softener is in the range of from 0.1 to 2.0, preferably from 0.2 to 1.0 gm/l of the aqueous treatment liquor.

In the powder preparations, the 3-aclyoxy-2-hydroxypropyl-trialkylammonium compounds, the textile softening and improving agents of the invention, are in a homogeneous admixture with the other components or in a finely divided form mixture with the other components or in a finely divided form on the surface of solid particles of the carrier or of the diluent, and the different types of particles may be combined with one another to form agglomerates. These pulverulent preparations are obtained by mixing the ammonium compounds together with the dispersing agent and the solid carrier substances in a suitable way.

The invention relates further to processes for the preparation of powder washing after-treatment agents for laundry of the above given composition.

According to a first process, the preparations of the invention are obtained by spraying the active ammonium substance, together with the nonionic dispersing agents and, optionally, other customary ingredients, particularly optical brighteners, in a liquid mixture with water and/or volatile organic solvents from the group of methanol, ethanol isopropanol, acetone, methylene chloride, chloroform, in the temperature range of from 20°C to 80°C onto a moving bed of the solid carriers.

In this method, preferably, carriers are used with a surface area as large as possible and a low bulk weight, for instance a bulk weight of from 100 to 700 gm/l. Products of such a bulk weight are obtained, for instance, by calcination of water-crystallization-containing inorganic salts, particularly of sodium sulfate.

A further process for the preparation of the agents of the invention comprises hot drying an aqueous mixture of the various components, which are preferably present therein at a concentration of from 15 to 35% by weight, at temperatures above 100°C, preferably in the range from 105°C to 125°C.

According to a preferred variant of this process, the hot drying is carried out by pouring the aqueous mixture in a thin film onto a hot surface. A further preferred variant comprises carrying out the hot drying by spraying the aqueous batch into a hot stream of gas.

In all cases, the pulverulent properties of the products can be improved by incorporation therein of small amounts of substances with a large surface area, for example, micro-crystalline silicic acid, magnesium silicate and so forth.

The preparations according to the invention prepared by the said processes, especially by the hot-drying methods, are marked by a good pouring behavior and good stability on storage, freedom from dust and rapid dispersibility in cold water. If the preparations of the invention contain components which are sensitive to temperature or readily volatile, for example, the antimicrobial substance or perfume further mentioned below, the latter are admixed with the finished powder products.

The pulverulent preparations are present as powders, agglomerates or granulates, of which the particle size should be from 0.1 to 3 mm, preferably at least 70% of the preparation having a particle size of from 0.3 to 2 mm. The expression "powdery" is used here in its general meaning, as it is normally used in connection with textile treatment agents, i.e. particle sizes are included which are finely powdered to coarsely powdered, inclusive of granulates and agglomerates.

The components contained in the washing after-treatment agents of the invention are described below, in addition to the 3-aclyoxy-2-hydroxypropyl-trialkylammonium compounds and the carrier substance, and are described more particularly by their various classes.

As nonionic dispersing agents, as they may be contained in the agents of the invention, nonionic surfactant-active agents are particularly suited, here designated in the following as "nonionics". These are products which owe their hydrophilic properties to the presence of polyether chains, amine oxide, sulfide or phosphine oxide groups, alkylamide groups as well quite generally to an excess of hydroxyl groups. Such nonionics contain in the molecule at least one hydrophobic radical of 8 to 26, preferably 10 to 20 and particularly 12 to 18 carbon atoms and at least one nonionic watersolubilizing group. The preferably saturated hydrophobic radical is mostly of an aliphatic, optionally also alicyclic nature. It can be connected directly to the hydrophilic groups or over connecting members. As connecting member, for instance, benzene rings, carboxylic acid ester or carbonamide groups, ether-like or ester-like bound radicals of polyhydric alcohols such as those of the ethylene glycol, the propylene glycol, the glycerine or of corresponding polyether radicals, are of interest.

Of particular practical interest are the products obtained by addition of ethylene oxide and/or glycidate to fatty alcohols, alkylene glycols, fatty acids, fatty amines, fatty acid or sulfonic acid amides having the above hydrophobic radicals. These nonionics may contain from 4 to 100, preferably 6 to 40 and particularly 8 to 20 ether groups, above all ethylene glycol ether groups, per molecule. In addition, in these polyether chains or at their end, propylene or butylene glycol ether groups or polyether chains may be present.

Further suitable non-ionic surface-active compounds are the water-soluble products of the addition of ethylene oxide to polypropylene glycol "Pluronic" or to alkylendiaminopolypropylene glycol "Tetronics" and alkylpolyglycol ethers with 1 to 10 carbon atoms in the alkyl chain, all containing 20 to 250 ethylene glycol ether groups and 10 to 100 propylene glycol ether groups and in which the polypropylene glycol chain acts as a hydrophobic residue.
In addition, the fatty acid or sulfonic acid alkylolamides which are derived, for instance, from mono or diethanolamine, from dihydroxyproplamine or other polyhydroxyalkylamines, for instance the glycamines are in the class of useable nonionics. They can be replaced by amides of higher primary or secondary alkylamines and polyhydroxy carboxylic acids.

Nonionic surface-active compounds of the aminoxide or aminesulfoxide type are also utilisable. The nonionic surface-active aminoxides include, for example, the products derived from higher tertiary amines having a hydrophobic alkyl residue and two shorter alkyl and/or alkoxy residues containing up to 4 carbon atoms each.

As nonionic dispersing agents, optionally suitable are also water-soluble or water-emulsifiable or dispersible compounds, which contain no hydrophobic radicals in the sense of the above-described nonionic surface-active agents or in which the nature or the number of the hydrophilic groups is insufficient to attain a complete water solubility. The former includes compounds such as solid or liquid polyethylene glycols, ethylene oxide adduits of glycerine and other polyalcohols, etc. The latter include, for example, partial fatty acid glycerides or water-insoluble or not completely water-soluble alkoxymation products, for example those with 2 to 5 ethylene glycoether residues in the molecule.

Inorganic and non-surface-active organic acids, innocuous to the fibers to be treated with 2 to 8 carbon atoms, optionally in the form of their slightly acidic water-soluble salts are suitable as acid additives or souring and sequestering agents, such as amidosulfonic acid, urea compounds of orthophosphoric acid, boric acid, oxalic acid, lactic acid, glycolic acid, citric acid, tartaric acid, benzoic acid, phthalic acid, glutaric acid, acetic acid and propionic acid as well as benzene, toluene or xylene sulfonic acids, sulfocetic acid or sulfobenzoic acids. Preferably the acid additives are hydroxyalkanoic acids having 2 to 8 carbon atoms, hydroxyalkanedioic acids having 3 to 8 carbon atoms, dihydroxyalkanedioic acids having 4 to 8 carbon atoms, hydroxyalkanetricoic acids having 4 to 8 carbon atoms and alkanoic acids having 2 to 8 carbon atoms.


Other usable antimicrobial active substances are the lower alcohols or diols, substituted both by bromine and nitro groups, with 3 to 5 carbon atoms, such as the compounds 2-bromo-2-nitropropanediol-1,3, 1-bromo-1-nitro-3,3,3-trichlopropano21-2, 2-bromo-2-nitrobutanol-1.

As anti-microbial active substances, also suitable are phenolic compounds of the type of the halogenated phenols with 1 to 5 halogen substituents, particularly chlorinated phenols; alkyl-, cycloalkyl-, aralkyl- and phenylphenols with 1 to 12 carbon atoms in the alkyl radical and with 1 to 4 halogen substituents, particularly chloro and bromine in the molecule; alkenyl bis-phenols, particularly derivatives substituted by 2 to 6 halogen atoms and optionally by lower alkyl or trifluoromethyl groups with an alkylene bridge consisting of 1 to 10 carbon atoms; hydroxy benzoic acids or their esters and amides, particularly anilides which may be substituted in the benzoic acid and/or aniline radical especially by 2 or 3 halogen atoms and/or trifluoromethyl groups; o-phenoxphenols which may be substituted by 1 to 7, preferably 2 to 5 halogen atoms and/or the hydroxyl, cyano, carbomethoxy, and carbonyl group or by lower alkyl. A particularly preferred derivative of the class of o-phenoxphenols is 2-hydroxy-2',4',4'-trichlorodiphenyl ether.

The usable brighteners are mostly, if not exclusively, derivatives of aminostilbene-sulfonic acid or dianomostilbene-sulfonic acid, 1,2-di-(2-benzoxazoly)-, or 1,2-di-(2-benzimidazoly)-ethylene, benzoxazolyl-thiophene and coumarins.

Examples for brighteners from the class of the derivatives of the dianomostilbene-disulfonic acid are compounds according to Formula II:

\[
\begin{align*}
\text{R}_1 & \quad \text{N} \quad \text{H} \quad \text{C}-\text{SO}_3^- \\
\text{R}_2 & \quad \text{N} \quad \text{H} \quad \text{C}-\text{SO}_3^- \\
\text{R}_3 & \quad \text{N} \quad \text{H} \quad \text{C}-\text{SO}_3^- \\
\text{R}_4 & \quad \text{N} \quad \text{H} \quad \text{C}-\text{SO}_3^- \\
\text{R}_5 & \quad \text{N} \quad \text{H} \quad \text{C}-\text{SO}_3^- \\
\text{R}_6 & \quad \text{N} \quad \text{H} \quad \text{C}-\text{SO}_3^- \\
\end{align*}
\]

In the formula R₁ and R₅ signify alkoxy groups, amino groups or residues of aliphatic, aromatic or heterocyclic, primary or secondary amines, or residues of aminosulfonyl acids, while aliphatic residues present in the above groups preferably contain 1 to 4 and especially 2 to 4 carbon atoms, and in the heterocyclic ring systems, five- or six-membered rings are usually of interest. Aniline, anisolein acid or anilinesulfonyl acid residues are preferred as the aromatic amines. Brighteners derived from dianomostilbene-sulfonic acid are mostly used as cotton brighteners. The following products derived from the above formula II in which R₁ represents the residue —NH—C₄H₉, and R₄ may represent the following residues, are at present on the market.
Instructions for preparation liquid after-treatment agents for laundry according to the invention (quantities in per cent by weight). For the preparation of the liquid agent, the textile softening agent together with the nonionic dispersing agent and the organic solvent, as well as optional other additives, were converted into an homogenous melt at 50° to 60°C. At the same time, the acid and possibly the optical brightener were dissolved in water, and this aqueous solution added the above-named melt with vigorous agitation. The thus-obtained preparation is distinguished by good poutrability and distributability in water. Perfumes and dyes may be added to the finished preparation.

EXAMPLE 1
7 % of 3,3'-Oxalylldioxy-bis-(2-hydroxypropylmethyltetradecylammonium chloride);
2 % of an adduct of mixed oleyl-cetyl alcohol + 10 mols of ethylene oxide;
1 % of citric acid;
90 % of water.

EXAMPLE 2
7 % of 3,3'-Malonyldioxy-bis-(2-hydroxypropylmethyltetradecylammonium chloride);
2 % of an adduct of mixed oleyl-cetyl alcohol + 5 mols of ethylene oxide;
1 % of glycolic acid
90 % of water.

EXAMPLE 3
7 % of 3,3'-Succinylldioxy-bis-(2-hydroxypropylmethyltetradecylammonium chloride);
2 % of an adduct of coconut alcohol (C11-C14) + 3 mols of ethylene oxide;
2 % of tartaric acid;
89 % of water.

EXAMPLE 4
7 % of 3,3'-Tartaryldioxy-bis-(2-hydroxypropylmethyltetradecylammonium chloride);
2 % of an adduct of nonylphenol + 9.5 mols of ethylene oxide;
1 % of tartaric acid;
90% of water.

**EXAMPLE 5**

7% of 3,3'-Oxalidoxy-bis-(2-hydroxypropylmethyliditetradecylammonium chloride);
6% of isopropyl alcohol;
2% of an adduct of coconut alcohol \((C_{12}-C_{16}) + 4\) mols of ethylene oxide;
1% of tartaric acid;
84% of water.

**EXAMPLE 6**

7% of 3,3'-Succinylidoxy-bis-(2-hydroxypropylmethyliditetradecylammonium chloride);
2% of isopropyl alcohol;
2% of an adduct of mixed cetly-oleyl alcohol + 10 mols of ethylene oxide;
1% of sodium acetate
88% of water.

**EXAMPLE 7**

7% of 3,3'-Malididoxy-bis-(2-hydroxypropylmethyliditetradecylammonium chloride);
10% of isopropyl alcohol;
2% of an adduct of nonylphenol + 40 mols of ethylene oxide;
2% of citric acid;
79% of water.

**EXAMPLE 8**

7% of 3,3'-Tartaryldidioxy-bis-(2-hydroxypropylmethyliditetradecylammonium chloride);
10% of isopropyl alcohol;
2% of an adduct of nonylphenol + 60 mols of ethylene oxide;
1% of glycolic acid;
80% of water.

**EXAMPLE 9**

7% of 3,3'-Malonyldidioxy-bis-(2-hydroxypropylmethyliditetradecylammonium chloride);
2% of an adduct of mixed cetly-oleyl alcohol + 5 mols of ethylene oxide;
0.1% of a cotton brightener of Formula II in which \(R_1\) represents anilino and \(R_2\) represents dihydroxyethylamino
90.9% of water.

**EXAMPLE 10**

7% of 3,3'-Tartaryldidioxy-bis-(2-hydroxypropylmethyliditetradecylammonium chloride);
2% of an adduct of mixed cetly-oleyl alcohol + 10 mols of ethylene oxide;
1% of tartaric acid;
0.2% of a cotton brightener of Formula II, in which \(R_1\) represents anilino and \(R_2\) represents dihydroxyethylamino;
89.8% of water.

**EXAMPLE 11**

7% of 3,3'-Malonyldidioxy-bis-(2-hydroxypropylmethyliditetradecylammonium chloride);
2% of an adduct of coconut alcohol \((C_{12}-C_{16}) + 4\) mols of ethylene oxide;
2% of citric acid;

**EXAMPLE 12**

0.2% of a cotton brightener of Formula II in which \(R_1\) represents anilino and \(R_2\) represents dihydroxyethylamino;
88.8% of water.

**EXAMPLE 13**

7% of 3,3'-Oxalidoxy-bis-(2-hydroxypropylmethyliditetradecylammonium chloride);
6% of isopropyl alcohol;
2% of an adduct of coconut alcohol \((C_{12}-C_{16}) + 3\) mols of ethylene oxide;
1% of tartaric acid;
0.2% of a cotton brightener of Formula II in which \(R_1\) represents anilino and \(R_2\) represents dihydroxyethylamino;
83.8% of water.

**EXAMPLE 14**

7% of 3-Malonoxy-2-hydroxypropyl-methyliditetradecylammonium chloride;
2% of an adduct of coconut alcohol \((C_{12}-C_{16}) + 3\) mols of ethylene oxide;
2% of amidosulfonic acid;
89% of water.

**EXAMPLE 15**

7% of 3-Malonoxy-2-hydroxypropyl-methyliditetradecylammonium chloride;
2% of an adduct of nonylphenol + 9.5 mols of ethylene oxide;
10% of isopropyl alcohol;
2% of tartaric acid;
79% of water.

**EXAMPLE 16**

7% of 3-Maloxo-2-hydroxypropyl-methylididodecylammonium chloride;
2% of an adduct of coconut alcohol \((C_{12}-C_{16}) + 4\) mols of ethylene oxide;
4% of isopropyl alcohol;
2% of tartaric acid;
0.2% of a cotton brightener of formula II in which \(R_1\) represents anilino and \(R_2\) represents morpholine;
84.8% of water.

**EXAMPLE 17**

7% of 3-Maloxo-2-hydroxypropyl-methyliditetradecylammonium chloride;
2% of an adduct of coconut alcohol \((C_{12}-C_{16}) + 4\) mols of ethylene oxide;
15
6 % of isopropyl alcohol;
2 % of glycolic acid;
0.2 % of a cotton brightener of Formula II in which \( R_1 \) represents anilino and \( R_2 \) represents morpholino;
82.8 % of water.

Examples 18 - 21
The following Examples describe the preparation and composition of pulverulent washing after-treatment agents for laundry according to the invention.

EXAMPLE 18
20 % of 3-Oxaloxy-2-hydroxypropylmethylididodecylammonium chloride;
3 % of an adduct of nonylphenol + 9.5 moles of ethylene oxide;
2 % of glycolic acid (100%);
55 % of urea;
20 % of sodium sulfate (anhydrous).
The preparation according to Example 18 was prepared as follows: the textile softening compound and the nonionic dispersing agent were melted to a homogenous mixture at 50° to 60°C. Simultaneously, the organic acid and the carriers were dissolved in water, preheated to 50°C, and the above-named melt was stirred into this solution. The amounts were utilized so that 1 kg of all the ingredients of the washing after-treatment agent of the above composition was allotted to 5 liters of water. The dispersion thus obtained was atomized in a spray tower at 105°C. A white, fine-grained and readily pourable powder resulted. To the finished preparation perfumes and anti-microbial active substances may be added.

EXAMPLE 19
20 % of 3,3’-Malonyldioxo-bis-(2-hydroxypropylmethyliditetradeylammonium chloride);
3 % of an adduct of nonylphenol + 9.5 moles of ethylene oxide;
2 % of glycolic acid (100%);
55 % of urea;
20 % of sodium sulfate (anhydrous).
The preparation according to Example 19 was prepared as follows: The textile softener, nonionic and glycolic acid (as a 70% solution) were mixed with water at 55°C to give a slurry. The liquid mixture was sprayed at this temperature with the aid of a spraying apparatus into a rotating drum and onto the powdery carrier substances. The latter consisted of a mixture of calcinated sodium sulfate of a bulk weight of 460 gm/l and of urea of a bulk weight of 485 gm/l. After the spraying, the product mixture was agitated for another 10 minutes in the drum. The other specified products, according to the invention, can also be prepared by this method.

EXAMPLE 20
20 % of 3-Malonoxy-2-hydroxypropyl-methyliditetradeylammonium chloride;
3 % of an adduct of nonylphenol + 9.5 moles of ethylene oxide;
2 % of glycolic acid (100%);
60 % of urea;
15 % of sodium sulfate (anhydrous).
The preparation according to Example 20 was prepared as follows: The textile softener and the nonionic dispersing agent were melted together at 50°C to 60°C to a homogeneous mixture and simultaneously glycolic acid, sodium sulfate and urea were mixed at 50°C with a 2-m fold amount of water. The above-named melt was stirred into this mixture and the slurry, thus obtained, was brought onto a roller-drier, whose rolls had a temperature of 140°C. The product, after evaporation of water, was formed as a thin solid layer, that was lifted off the rolls in the form of scales. The scales were converted into a powder by grinding. The other specified preparations, according to the invention, can also be prepared by this method.

EXAMPLE 21
20 % of 3,3’-Malonylhydroxy-bis-(2-hydroxypropylmethyliditetradeylammonium chloride);
3 % of an adduct of mixed oleyl-cetyl alcohol + 10 moles of ethylen oxide;
2 % of glycolic acid (100%)
0.2 % of a cotton brightener of formula II in which \( R_1 \) represents anilino and \( R_2 \) represents morpholino;
55 % of urea;
20 % of sodium sulfate (anhydrous).
This preparation was prepared by the method described in Example 18.
Using the methods of Examples 18 - 21, washing after-treatment preparations can also be prepared with the other compounds listed in Table I.
The washing after-treatment agents for laundry according to the invention are marked by a rapid dispersibility and distribution in cold water, so that the action of the textile softener, for example on use in the last rinsing cycle of a washing machine, is effective. The treatment with the preparations of the invention at a concentration of 0.5 gm of the textile softener per liter of rinsing bath already leads to a full and soft handle of the finished textiles, which are also marked by a good absorption capacity.

EXAMPLE 22
a. Determination of the softening action
The determination of the softening action of the 3-acloyloxy-2-hydroxypropyl-trialkylammonium compounds was carried out with an aqueous dispersion of the preparations according to the invention.
For this, samples of prepared cotton terry cloth were rinsed in the presence of clean carrier fabric with an aqueous dispersion which contained 0.5 gm/l of active substances, prepared as in Examples 1 to 21, in the last rinse of a drum-washing machine (duration: 5 minutes; liquor ratio 1:25). The samples were then centrifuged and dried by hanging. Subsequently, the hand was judged independently by 4 persons. The evaluation of the hand was expressed in numbers between 1 and 6, 1 = full and very soft hand, and 2 = very hard hand.
The average values of the evaluations were calculated that are summarized in the following Table II. The controlling values were as follows:
Fabric Type A: Samples of new cotton terry cloth were treated for 240 hours in a washing machine under boiling washing conditions with 2.0 gm/l of sodium tri-
polyphosphate solution. After drying, the hand number 6 was assigned to this thus pre-hardened fabric.

Fabric Type B: Samples of new cotton terry cloth were treated 15 times with a commercial heavy duty washing agent in an automatic washing machine. After drying, such pre-hardened fabrics were assigned the hand number 4. The hand number 1 was assigned to samples of new cotton terry cloth where the sizing was removed and they were treated with a solution of 0.5 gm/l of ditallowalkyl-di-methylammonium chloride. The softness of new, unlaundered cotton terry cloth corresponds generally to the hand numbers 1.5 to 2.

**TABLE II**

<table>
<thead>
<tr>
<th>Exp. No.</th>
<th>3-acycloxy-2-hydroxy propyltri-alkyl ammonium compounds (known data)</th>
<th>Type of fabric</th>
<th>Average Hand Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3-Oxaloxy-2-hydroxypropyl-methyl didodecylammonium chloride</td>
<td>A</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>(found: N 2.55% CI 0.646%; calculated: N 2.70% CI 0.659%)</td>
<td>B</td>
<td>2.0</td>
</tr>
<tr>
<td>2</td>
<td>3,3'-Malonyldioxy-bis-(2-hydroxypropyl)-methyltrimethylammonium chloride</td>
<td>A</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>(found: N 2.17% CI 0.715%; calculated: N 2.46% CI 0.624%)</td>
<td>B</td>
<td>2.0</td>
</tr>
<tr>
<td>3</td>
<td>3-Malonyoxy-2-hydroxypropyl-methyltrimethylammonium chloride</td>
<td>A</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>(found: N 2.30% CI 0.14.81% CI 6.49%; calculated: N 2.50% CI 0.14.66% CI 6.59% acid value 105 (calculated 104))</td>
<td>B</td>
<td>1.9</td>
</tr>
<tr>
<td>4</td>
<td>3,3'-Malonyldioxy-bis-(2-hydroxypropyl)-methyltrimethylammonium chloride</td>
<td>A</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>(found: N 2.41% CI 0.638%; calculated: N 2.40% CI 0.609%)</td>
<td>B</td>
<td>2.0</td>
</tr>
<tr>
<td>5</td>
<td>without textile softener</td>
<td>A</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Result:

According to the values of Table I, the one treatment of the pre-hardened or hardened-by-washing cotton terry cloth of type A or B with the dispersions of the active substances of the invention leads to a full and soft hand.

b. Determination of the absorption capacity (measurement of the rise in height)

The influence of the textile softening agents, used according to the invention, on the absorptivity of the cotton fabrics, treated with these active substances, was determined by the ascending method [Jörder, Zeitschrift fur die gesamte Textilindustrie, 64, 593(1962), ibid. 67.22 (1965)].

A cotton test fabric, previously extracted with methanol and dichloromethane served as test material. This test fabric was agitated with a dispersion of 0.5 gm/l of the test preparation for one hour, subsequently centrifuged, dried and ironed between filter paper. After conditioning 20°C and 65% relative air humidity for 24 hours, these strips, 20 cm long and 2.5 cm wide, were suspended with their lower ends in distilled water and the rise in height d of the water after a time j of 1, 2, 5, 10, 20 and 30 minutes were measured. Fabric which had only been treated with water served for comparison, and also fabric treated with 0.5 gm per liter of dioctadecyl-dimethylammonium chloride as a substance for comparison. N = 8 parallel measurements were carried out.

**TABLE III**

<table>
<thead>
<tr>
<th>Exp. No.</th>
<th>Substance</th>
<th>S (%)</th>
<th>V (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3-Oxaloxy-2-hydroxypropyl-methyl didodecylammonium chloride</td>
<td>73.4</td>
<td>340</td>
</tr>
<tr>
<td>2</td>
<td>3,3'-Malonyldioxy-bis-(2-hydroxypropyl)-methyltrimethylammonium chloride</td>
<td>73.5</td>
<td>340</td>
</tr>
<tr>
<td>3</td>
<td>3-Malonyoxy-2-hydroxypropyl-methyltrimethylammonium chloride</td>
<td>67.6</td>
<td>300</td>
</tr>
<tr>
<td>4</td>
<td>3,3'-Malonyldioxy-bis-(2-hydroxypropyl)-methyltrimethylammonium chloride</td>
<td>70.1</td>
<td>320</td>
</tr>
<tr>
<td>5</td>
<td>Untreated samples (water value)</td>
<td>100.0</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>Comparison N,N-Dioctadecyl-N,N-dimethylammonium chloride (known textile softener)</td>
<td>16.5</td>
<td>0</td>
</tr>
</tbody>
</table>

c. Determination of the absorptive capacity (measurement of spreading time)

The influence of the textile softeners, used according to the invention, on the absorptivity of cotton test fabrics, softening rinsed with these preparations, was also determined by the method of Oxé and Schuster [Schuster, Textil-Rundschau 20, 352 (1965)]. Here
the spreading-out time $t$ of water in a horizontally spread cotton test strip under exactly defined conditions with the use of an absorptivity value meter was determined. As test material, a cotton test fabric, previously extracted with methanol and dichloromethane, was used. It was agitated for 30 minutes with a dispersion of the test preparation (conc. 0.5 g/ml); subsequently dried and air-conditioned. A fabric analogously treated with water served as a comparison sample. The measurement was done with an absorptivity value meter, according to Oxé and Schuster. The distance of the measuring contacts was adjusted to 5 cm and a dropping time of 10 sec. was selected. In the normal case ten parallel measurements were carried out.

The absorption time is, according to the true dimension (sec/cm), a reciprocal speed. An increase, therefore, corresponds to a decrease in the absorptivity of the fabric.

If $t$ is designated as the absorption time of the fabric rinsed with the preparation $i$ and $t_{\text{wa}}$ the absorption time of the fabric rinsed with water, for the absorption value, that is the residual absorptivity of the so-rinsed fabric, referred to the sample treated with water $= 100\%$, the following equation is used.

$$a = 100 \left( \frac{t_{\text{wa}}}{t_i} \right) \%$$

As comparison also the absorption time $t_{w}$ of a test fabric rinsed with a solution of 0.5 g/ml of N,N-didodecyl-N,N-dimethyl-ammonium chloride was determined and from it the percentual improvement $\beta$ of the absorptivity of the preparations $i$ with reference to N,N-didodecyl-N,N-dimethyl-ammonium chloride was calculated.

$$\beta = 100 \left( \frac{t_{w}}{t_i} - 1 \right) \%$$

In the Table IV the measured absorption time $t$, the absorption values $a$ and the percentual improvement $\beta$ for some 3-acyloxy-2-hydroxypropyl-trialkylammonium compounds are given.

<table>
<thead>
<tr>
<th>Expt. No.</th>
<th>Active Substance</th>
<th>$t$ (sec.)</th>
<th>$a$ (%)</th>
<th>$\beta$ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3-Oxaloy-2-hydroxypropyl-methyl-didodecylammonium chloride</td>
<td>38</td>
<td>84.2</td>
<td>420</td>
</tr>
<tr>
<td>2</td>
<td>3,3'-Malonyldioxy-bis(2-hydroxypropyl-methyl)ditetradecylammonium chloride</td>
<td>47</td>
<td>68.1</td>
<td>320</td>
</tr>
<tr>
<td>3</td>
<td>3-Malonoxy-2-hydroxypropyl-methyl-didodecylammonium chloride</td>
<td>39</td>
<td>82.1</td>
<td>410</td>
</tr>
<tr>
<td>4</td>
<td>3,3'-Malonoxy-bis(2-hydroxypropyl)methyl)ditetradecylammonium chloride</td>
<td>45</td>
<td>71.1</td>
<td>340</td>
</tr>
<tr>
<td>5</td>
<td>Untreated samples (water value)</td>
<td>32</td>
<td>100.0</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>Comparison N,N-Didodecyl-N,N-dimethyl-ammonium chloride (known textile softener)</td>
<td>200</td>
<td>&lt;16.0</td>
<td>0</td>
</tr>
</tbody>
</table>

These tests demonstrate the superiority of the textile softening agent compositions of the invention.

EXAMPLE 23

The following example describes a liquid after treatment agent for laundry in aerosol form to be sprayed a. into a clothes dryer before adding the clothes, or b. onto the damp clothes in a drier.

20 % of 3,3'-Succinylidioxy-bis(2-hydroxypropyl-methyl)ditetradecylammonium chloride;
2 % of an adduct of mixed ceteryl-oleyl alcohol + 10 mols of ethylene oxide;
28 % of isopropyl alcohol;
25 % of difluorodichloromethane;
25 % of tetrafluorodichloromethane.

The aerosol composition is prepared by mixing the textile softening compound, the nonionic dispersing agent and the isopropyl alcohol; traces of perfumes can be added to this mixture. This mixture is filled into a usual aerosol container, and the container subsequently pressurized with a mixture of the propellants.

The preceding specific embodiments are illustrative of the practice of the invention. It is to be understood, however, that other expedients known to those skilled in the art, or disclosed herein, may be followed without departing from the spirit of the invention or the scope of the appended claims.

We claim:

1. A liquid or powdery softening agent composition for washed textiles consisting essentially of

   a. from 1 to 50 % by weight of a 3-acyloxy-2-hydroxypropyl-trialkylammonium compound of the formula

   $$\text{CH}_{2}-\text{CH}-\text{CH}-\text{N}^{+}-\text{R}_{3}-\text{X}^{\ominus}$$

   wherein $m$ and $n$ are integers from 0 to 4 and the sum of $m + n$ is an integer from 0 to 4, $R_{3}$ and $R_{4}$ are selected from the group consisting of alkyl and alkenyl having from 10 to 24 carbon atoms, $R_{3}$ is alkyl having 1 to 4 carbon atoms, $A$ is selected from the group consisting of hydrogen and hydroxyl group, and $X^{\ominus}$ is a counter ion.

2. A textile softening agent composition as claimed in claim 1 wherein $m$ and $n$ are integers from 0 to 4 and the sum of $m + n$ is an integer from 0 to 4, $R_{3}$ and $R_{4}$ are selected from the group consisting of alkyl and alkenyl having from 10 to 24 carbon atoms, $R_{3}$ is alkyl having 1 to 4 carbon atoms, $A$ is selected from the group consisting of hydrogen and hydroxyl group, and $X^{\ominus}$ is a counter ion.

3. A textile softening agent composition as claimed in claim 1 wherein $m$ and $n$ are integers from 0 to 4 and the sum of $m + n$ is an integer from 0 to 4, $R_{3}$ and $R_{4}$ are selected from the group consisting of alkyl and alkenyl having from 10 to 24 carbon atoms, $R_{3}$ is alkyl having 1 to 4 carbon atoms, $A$ is selected from the group consisting of hydrogen and hydroxyl group, and $X^{\ominus}$ is a counter ion.

4. A textile softening agent composition as claimed in claim 1 wherein $m$ and $n$ are integers from 0 to 4 and the sum of $m + n$ is an integer from 0 to 4, $R_{3}$ and $R_{4}$ are selected from the group consisting of alkyl and alkenyl having from 10 to 24 carbon atoms, $R_{3}$ is alkyl having 1 to 4 carbon atoms, $A$ is selected from the group consisting of hydrogen and hydroxyl group, and $X^{\ominus}$ is a counter ion.

5. A textile softening agent composition as claimed in claim 1 wherein $m$ and $n$ are integers from 0 to 4 and the sum of $m + n$ is an integer from 0 to 4, $R_{3}$ and $R_{4}$ are selected from the group consisting of alkyl and alkenyl having from 10 to 24 carbon atoms, $R_{3}$ is alkyl having 1 to 4 carbon atoms, $A$ is selected from the group consisting of hydrogen and hydroxyl group, and $X^{\ominus}$ is a counter ion.
is an anion selected from the group consisting of halide and the anion of an organic non-surface-active acid having 2 to 8 carbon atoms,

b. from 0.2 to 10% by weight of at least one nonionic surface-active dispersing agent selected from the group consisting of a water-soluble dispersing agent and a water-dispersible dispersing agent,

c. from 0 to 15% by weight of at least one member selected from the group consisting of optical brighteners, anti-microbial active agents, souring agents, sequestering agents, perfumes and dyes, and

d. the remainder up to 100% by weight of at least one diluent selected from the group consisting of water, and water-soluble or readily water-dispersible liquid and solid carriers.

2. The liquid or powdery softening agent composition of claim 1 wherein R₁ and R₂ are alkyl having 12 to 18 carbon atoms.

3. The liquid or powdery softening agent composition of claim 1 wherein component c) comprises from 0.2 to 6% of an acid additive.

4. The composition of claim 1 wherein said diluent is selected from the group consisting of water, water-soluble organic solvents and mixtures thereof in an amount of from 74 to 97.8% by weight.

5. The liquid composition of claim 4 containing from 5 to 15% by weight of component a), from 0.5 to 3% by weight of component b), from 0.3 to 7.5% by weight of component c) and from 1.0 to 15% by weight of water-soluble organic solvents and the remainder up to 100% by weight of water.

6. The composition of claim 5 wherein component c) contains at least one of said conventional ingredients in the following amounts:

from 0.2 to 3% by weight of antimicrobial active compounds,

from 0.2 to 6% by weight of said acid additives,

from 0.01 to 0.5% by weight of said cotton optical brighteners,

from 0.01 to 0.5% by weight of said polyamide optical brighteners,

from 0.01 to 0.5% by weight of said perfumes, and

from 0.00001 to 0.05% by weight of said dyes.

7. The composition of claim 1 wherein said diluent is a finely-divided solid selected from the group consisting of inert water-soluble, finely-divided solids and inert, readily water-dispersible, finely-divided solids, in an amount of from 40 to 98.8% by weight.

8. The powdery composition of claim 7 wherein said solid is finely-divided solid diluent is selected from the group consisting of urea, acetamide, biuret, sodium sulfate, solid polyethylene glycols and mixtures thereof.

9. The powdery composition of claim 8 containing from 5 to 25% by weight of component a) from 1 to 6% by weight of component b) from 0.3 to 15% by weight of component c) and the remainder up to 100% by weight of component d).

10. The composition of claim 8 wherein component c) contains at least one of said conventional ingredients in the following amounts:

from 0.2 to 5.0% by weight of antimicrobial active substance,

from 0.1 to 10.0% by weight of an acid additive,

from 0.01 to 0.8% by weight of cotton brighteners,

from 0.01 to 0.8% by weight of polyamide brighteners,

from 0.01 to 0.8% by weight of perfume,

from 0.00001 to 0.08% by weight of dye.

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