

Description**BACKGROUND OF THE INVENTION****Field of the Invention:**

This invention relates to a detergent composition, and, more particularly, to a detergent composition comprising an anionic or amphoteric surface active agent and a branched quaternary ammonium salt. The detergent composition is suitable for use as a shampoo, which provides superb hair conditioning effects, including softness and smoothness after washing, easy hair-set after drying, less sticky feeling, easiness of comb or finger passage through the hair. The detergent composition also provides a liquid detergent for washing cloths, which ensures softness of the cloths, especially those made of keratin fibers such as wool or the like, or made of fine denier fibers, after washing.

Description of the Background:

US-A-3,892,669 describes a clear, homogeneous, aqueous fabric softening composition containing a solubilized tetraalkyl quaternary ammonium salt having two short chain alkyl groups and two long chain alkyl groups, together with a solubilizer comprising aryl sulfonates.

GB-A-2,172,607 describes a rinse aid composition for use in association with mechanical type dishwashers. The composition comprises effective amounts of a quaternary ammonium compound, a hydrophilic polymer and an amphoteric surfactant.

US-B-438,048 describes a shampoo creme rinse comprising anionic or amphoteric detergents and a quaternary ammonium compound having a benzyl radical.

EP-A-0 150 433 describes a shampoo composition comprising an anionic surface active agent, an amino acid-type anionic surface active agent and an amphoteric surface active agent in a specified ratio.

EP-A-0 247 832 describes a detergent composition comprising in an aqueous medium at least one amphoteric surfactant, at least one monoalkyl quaternary ammonium salt cationic surfactant and at least one carboxylate anionic surfactant.

Many types of detergent compositions are commercially sold in recent years, which contain a cationic polymer such as a cationic cellulose, or a cationic surface active agent, in order to provide the washed hair with excellent conditioning effects or for the purpose of giving cloths an excellent soft feeling after washing. Most of these detergents can provide good softness to the hair or cloths after washing.

These conventional detergents, however, have drawbacks of poor detergent capability and insufficient softness of the hair or the cloths after drying because of cationic polymers or cationic surface active agents used in the detergents. More specifically, detergents for cloths into which a cationic surface active agent is formulated exhibit rather poor dirt-elimination capability due to an adverse effect of the cationic surfactant. Even though such a cationic surface active agent is employed in an amount small enough not to impair the detergent capability of the composition, softness of the finished cloths is still to be improved. Shampoos containing a cationic surface active agent tend to impart a sticky feel when the hair is dried after washing and to adversely affect a smooth passage of comb through the hair. In addition, a complex of a surface active agent and a cationic polymer solidifies in the course of hair drying and causes hair-fly or hardens the hair, thus providing insufficient conditioning effects. The use of increased amount of cationic polymer to eliminate these drawbacks brings about more stickiness and damages a smoothness or softness of the finished hair.

Because of this, there has been a strong desire for the development of a detergent which can provide an excellent conditioning effect to the hair or the cloths after washing and drying, specifically, providing softness, smoothness, and fine delicate feeling to the finished hair or the cloths.

The present inventors have undertaken extensive studies for the resolution of the above drawbacks in the conventional detergents, and found that a detergent composition to which a branched quaternary ammonium salt is formulated, in addition to an anionic or amphoteric surface active agent, gives a delicate softness to cloths after washing and provides soft, smooth feeling to the hair, eliminating the drawbacks of conventional shampoo compositions to which a cationic polymer is formulated, e.g. imparting stickiness in the course of drying or producing hardened hair after drying.

SUMMARY OF THE INVENTION

The present invention provides a detergent composition comprising

(A) 0.1 to 40 % by weight of at least one kind of anionic or amphoteric surface active agents selected from the following (1) to (5):

(1) Alkyl- or alkenylether sulfates having a linear or branched, alkyl or alkenyl group of an average carbon atom content of 10 to 20 and having, in a molecule, 0.5 to 8 mols of ethylene oxide adduct, propylene oxide adduct, butylene oxide adduct, ethylene oxide-propylene oxide adduct with a ratio of ethylene oxide/propylene oxide being 0.1/9.9 to 9.9/0.1, or ethylene oxide-butylene oxide adduct with a ratio of ethylene oxide/butylene oxide being 0.1/9.9 to 9.9/0.1,

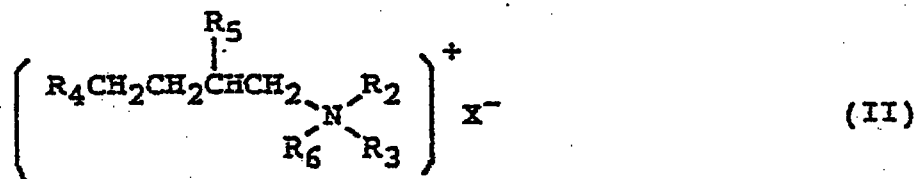
(2) Alkyl- or alkenyl sulfates having an alkyl or alkenyl group of an average carbon atom content of 10 to 20,

(3) Olefin sulfonates having an average carbon atom content of 10 to 20 in a molecule,

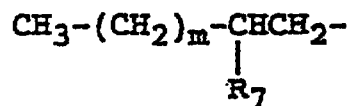
(4) Saturated or unsaturated fatty acids having an average carbon atom content of 10 to 24, and

(5) Imidazoline-type amphoteric surface active agents of α -position addition-type, secondary amido-type amphoteric surface active agents, or tertiary amido-type amphoteric surface active agents, having an alkyl, alkenyl, or acyl group of an 8 to 24 carbon atom content;

(B) 0.05 to 4% by weight of at least one kind of quaternary ammonium salts represented by the following formula (I) or (II):



wherein R_1 represents a mixture of (a) a branched alkyl group represented by



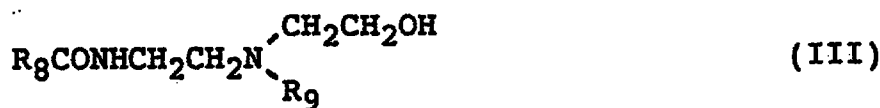
and (b) a linear alkyl group represented by $CH_3 - (CH_2)_n -$ (wherein R_7 represents a methyl or ethyl group, m is an integer to make the carbon atom content of the branched alkyl group to 8 to 16, and n is an integer of 7 to 15), with a ratio (a)/(a) + (b) being 0.1 to 1, R_2 and R_3 independently represent an alkyl group having 1 to 3 carbon atoms, or a hydroxyalkyl group having 1 to 3 carbon atoms, R_4 and R_5 independently represent an alkyl group having 2 to 12 carbon atoms, R_6 represents a group



or an alkyl group having 1 to 3 carbon atoms, and X^- represents a halogen ion or an organic anion.

Another object of this invention is to provide a detergent composition comprising, in addition to the above (A) and (B) components, (C) 0.05 to 2% by weight of at least one cationic polymer selected from the group consisting of cationized cellulose derivatives, cationic starch, copolymers of a diallyl quaternary ammonium salt and an acrylamide, quaternized polyvinylpyrrolidone derivatives, and polyglycol-polyamine condensates.

It is a more specific object of the present invention to provide a detergent composition, wherein 0.1 to 25% by weight, based on the detergent composition, of said (A) component is one or more amidoamine-type amphoteric surface active agents represented by the following formula (III) or (IV):



wherein R_8 and R_{10} each independently represent a saturated or unsaturated hydrocarbon group having 7 to 19 carbon atoms, R_9 and R_{11} each independently represent a group $-\text{CH}_2\text{COOM}$ or $-\text{CH}_2\text{CH}_2\text{COOM}$ (wherein M stands for a hydrogen atom, an alkali metal, or an alkanol amine), R_{12} represents a hydrogen atom, a group $-\text{CH}_2\text{COOM}$, or a group $-\text{CH}_2\text{CH}_2\text{COOM}$ (wherein M has the same meaning as defined above).

Other objects, features and advantages of the invention will hereinafter become more readily apparent from the following description.

DETAILED DESCRIPTION OF THE INVENTION AND PREFERRED EMBODIMENTS

Following anionic and amphoteric surface active agents can be used as the (A) component surfactant:

Anionic surface active agent

(1) Alkyl- or alkenylether sulfates having a linear or branched, alkyl or alkenyl group of an average carbon atom content of 10 to 20 and having, in a molecule, 0.5 to 8 mols of ethylene oxide adduct, propylene oxide adduct, butylene oxide adduct, ethylene oxide-propylene oxide adduct with a ratio of ethylene oxide/propylene oxide being 0.1/9.9 to 9.9/0.1, or ethylene oxide-butylene oxide adduct with a ratio of ethylene oxide/butylene oxide being 0.1/9.9 to 9.9/0.1.

(2) Alkyl- or alkenyl sulfates having an alkyl or alkenyl group of an average carbon atom content of 10 to 20.

(3) Olefin sulfonates having an average carbon atom content of 10 to 20 in a molecule.

(4) Saturated or unsaturated fatty acids having an average carbon atom content of 10 to 24.

Amphoteric surface active agent

(4) Imidazoline-type amphoteric surface active agents of α -position addition-type, secondary amido-type amphoteric surface active agents, or tertiary amido-type amphoteric surface active agents, having an alkyl, alkenyl, or acyl group of an 8 to 24 carbon atom content.

Given as counter-ions for the anionic residual group of these surface active agents are alkali metal ions such as sodium or potassium ion, alkali earth metal ions such as calcium or magnesium ions, ammonium ion, alkanol amine ions having 1 to 3 alkanol groups with a 2 or 3 carbon atom content such as monoethanolamine, diethanolamine, triethanolamine and tri-i-propanolamine.

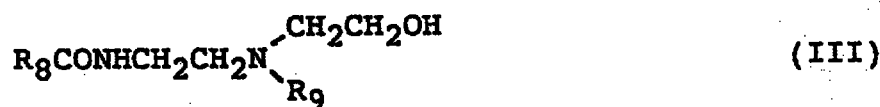
When these types of salts are used, the surface active agent tends to contain inorganic salts as contaminants. It is desirable that such inorganic salts be removed from the surface active agent so that the content of the inorganic salt contaminants in the final detergent product be less than 1 % by weight.

Counter ions for cationic groups may be halogen ions such as chlorine, bromine, or iodine, methosulfate ion or succarinate ion.

Given as specific examples of suitable anionic surface active agents are sodium polyoxyethylenelauryl ether sulfate (ethylene oxide addition: 2 - 3 mols in average) triethanolamine lauryl sulfate, sodium α -olefin sulfonate (average carbon atom content: 12 - 14), sodium salt of tallow/coconut (80/20) oil

fatty acids, and the like.

Amido-amine type compounds represented by the following formula (III) or (IV) are given as examples of suitable amphoteric surface active agents.



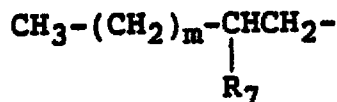
wherein R_8 and R_{10} each independently represent a saturated or unsaturated hydrocarbon group having 7 to 19 carbon atoms, R_9 and R_{11} each independently represent a group $-CH_2COOM$ or $-CH_2CH_2COOM$ (wherein M stands for a hydrogen atom, an alkali metal, or an alkanol amine), R_{12} represents a hydrogen atom, a group $-CH_2COOM$, or a group $-CH_2CH_2COOM$ (wherein M has the same meaning as defined above).

Specific examples of suitable amido-amine type surface active agents represented by the formula (III) include N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylenediamine, N-lauroyl-N'-carboxyethyl-N'-(2-hydroxyethyl)ethylenediamine, N-myristoyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylenediamine, N-myristoyl-N'-carboxyethyl-N'-(2-hydroxyethyl)ethylenediamine, N-palmitoyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylenediamine and N-palmitoyl-N'-carboxyethyl-N'-(2-hydroxyethyl)ethylenediamine, as well as their salts. Given as specific examples of suitable amido-amine type surface active agents represented by the formula (IV) are N-lauroyl-N-(2-hydroxyethyl)-N'-carboxymethylethylenediamine, N-lauroyl-N-(2-hydroxyethyl)-N',N'-bis(carboxymethyl)ethylenediamine, N-lauroyl-N-(2-hydroxyethyl)-N',N'-bis(carboxyethyl)ethylenediamine, N-myristoyl-N-(2-hydroxyethyl)-N'-carboxymethylethylenediamine, N-myristoyl-N-(2-hydroxyethyl)-N',N'-bis(carboxymethyl)ethylenediamine, N-myristoyl-N-(2-hydroxyethyl)-N',N'-bis(carboxyethyl)ethylenediamine, N-palmitoyl-N-(2-hydroxyethyl)-N'-carboxymethylethylenediamine, N-palmitoyl-N-(2-hydroxyethyl)-N',N'-bis(carboxymethyl)ethylenediamine and N-palmitoyl-N-(2-hydroxyethyl)-N',N'-bis(carboxyethyl)ethylenediamine, as well as their salts.

Surface active agents may be used either individually or in combination with one or more other surface active agents.

Among the (B) components, branched quaternary ammonium salts represented by the general formula (I) are produced, for example, from oxo alcohols having an 8 to 16 carbon atom content. Specific examples are dialkyldimethylammonium salt or dialkylmethylhydroxyethylammonium salt, all having an alkyl group derived from an oxo alcohol. Counter ions for these ammonium salts may be a halogen ion such as chlorine ion, bromine ion, or iodine ion, or an organic anion such as methosulfate, ethosulfate, methophosphate or ethophosphate.

The alkyl group, R_1 in formula (I), is a group comprised of (a) a group represented by



(wherein R_7 represents a methyl or ethyl group) and (b) a group represented by $CH_3-(CH_2)_n-$, both having an 8 to 18 carbon atom content. "Branched ratio" for R_1 , (a)/(a) + (b), is in the range of 0.1 to 1, and particularly preferably in the range of 0.1 to 0.5. Although the total carbon number of the alkyl group R_1 is 8 to 16, preferable groups are those having a certain distribution of the carbon atom content.

$C_8 - C_{11}$: less than 5%

C_{12} : 10 - 35%

C_{13} : 15 - 40%

C_{14} : 20 - 45%

C₁₅: 5 - 30%

C₁₆: less than 5%

Specific examples of particularly preferably branched quaternary ammonium salts represented by formula (I) are dialkyldimethylammonium chloride in which the alkyl group R₁ has 8 to 16 carbon atoms and the branched ratio is 0.1 to 0.5.

A branched quaternary ammonium salt represented by formula (II), which is the (B) component of the present invention, can be synthesized, for example, using as a raw material a Guerbet alcohol



Given as preferably examples of this branched quaternary ammonium salt are monoalkyl-type quaternary salts such as alkyltrimethylammonium salt and alkylmethylhydroxyethylammonium salt; dialkyldimethylammonium salt, dialkylmethylhydroxyethylammonium salt, and the like, all having an alkyl group derived from Guerbet alcohol. Given as counter-ions for the ammonium salts are halogen ions such as chlorine ion, bromine ion, or iodine ion, or organic anions such as methosulfate, ethosulfate, methophosphate or ethophosphate. Examples of alkyl groups derived from Guerbet alcohols include 2-hexyldecyl group, 2-octyldodecyl group, 2-decyltetradecyl group and 2-dodecylhexadecyl group. Particularly preferable examples of branched quaternary ammonium salts of formula (II) are 2-decyltetradecyltrimethylammonium chloride, 2-dodecylhexadecyltrimethylammonium chloride, di-2-hexyldecyldimethylammonium chloride and di-2-octyldodecylammonium chloride.

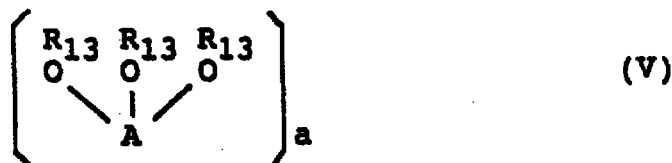
These branched quaternary ammonium salts represented by formula (I) or (II) can be employed either individually or in combination. In view of reduced stickiness of the detergent composition quaternary ammonium salts represented by formula (II) are generally preferable.

The amount of the (A) component to be formulated into the detergent composition of this invention is in the range of 0.1 to 40% by weight, and preferably 10 to 25% by weight. The amount of the (B) component is 0.05 to 4%, with a preferable range being 0.1 to 1% by weight.

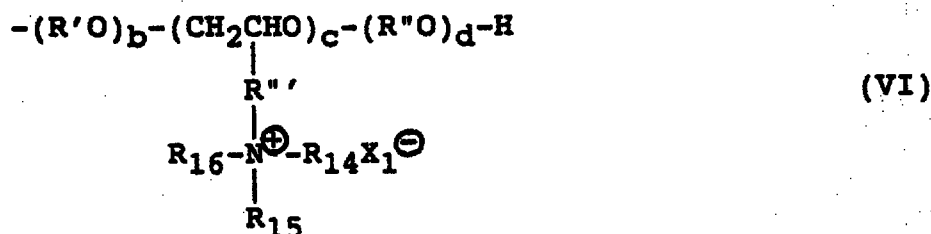
Besides the above two essential components, various components commonly known for use in a detergent composition can be formulated. Such components to be added into a shampoo include, for example, nonionic surface active agents, moisturizing agent such as propylene glycol and glycerin, pH adjustment agents such as phosphoric acid and citric acid, viscosity adjustment agents such as ethanol, higher alcohols, hydroxyethyl cellulose and methyl cellulose, conditioning agent such as oils or fats of plants or animals origin, UV ray absorbers, antioxidants, anti-dandruff agents, antifungals and agents for modifying outward appearance such as pearling agents. Additives for cloth detergent compositions include foaming agents, de-foaming agents, dirt-reattachment inhibitors, metal ion sealing agents, fluorescents and enzymes. In addition, antiseptics, coloring agents and perfumes are formulated as required.

Among the above-mentioned optional ingredients, (C) one or more cationic polymers selected from the group consisting of cationized cellulose derivatives, cationic starch, copolymers of a diallyl quaternary ammonium salt and an acrylamide, quaternarized polyvinylpyrrolidone derivatives, and polyglycol-polyamine condensates, when formulated into the detergent composition, provide even superior conditioning effects.

The compounds represented by the following formula (V) is desirable for use as cationized cellulose derivatives:



wherein A represents an anhydrous glucose unit residue, a denotes an integer of 50 to 20,000, and each R₁₃ individually represents a group represented by the following formula (VI):



wherein R' and R'' individually represents an alkylene group having 2 or 3 carbon atoms, b is an integer of 0 to 10, c is an integer of 0 to 3, d is an integer of 0 to 10, R'' represents an alkylene group or a hydroxyalkylene group each having 1 to 3 carbon atoms, R₁₄, R₁₅, and R₁₆ may be the same or different and represent alkyl groups, aryl groups, aralkyl groups, each having not more than 10 carbon atoms, or may form a heterocycle together with the nitrogen atom, and X₁ represents an anionic ion (chlorine, bromine, iodine, sulfuric acid, sulfonic acid, methyl sulfate, phosphoric acid and nitric acid).

A preferable range of the cation substitution degree of cationized cellulose is 0.01 to 1, i.e., in terms of the average value of c for anhydrous glucose 0.01 to 1, and preferably 0.02 to 0.5. The average of b plus d is 1 to 3. A substitution degree of below 0.01 is not sufficient. The value not more than 1 is preferable in view of the reaction yield; although the value above 1 can be acceptable. The molecular weight of the cationic cellulose used is between 100,000 and 3,000,000.

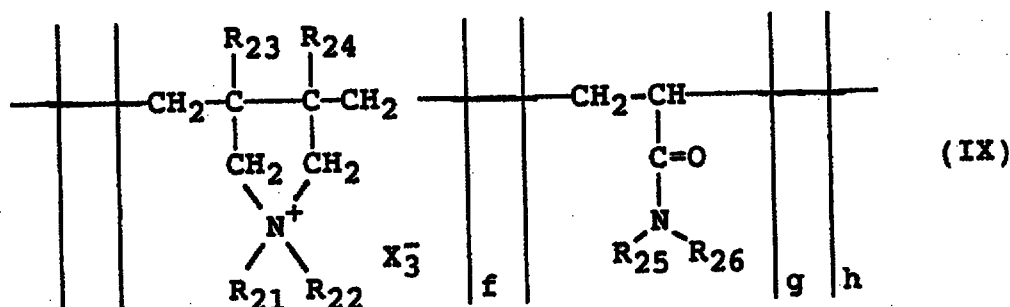
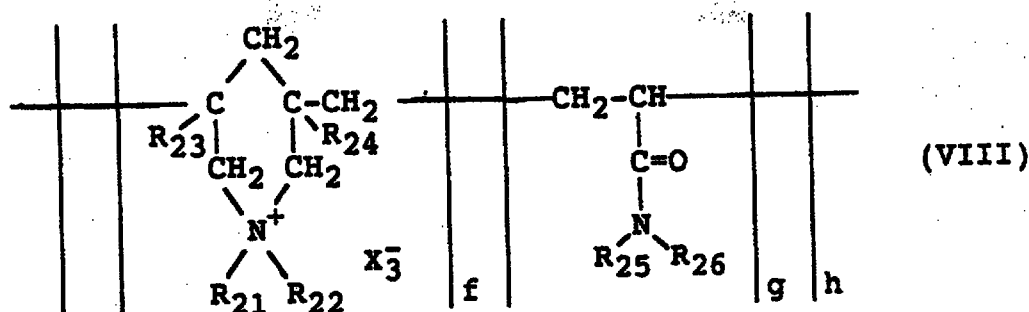
The compounds represented by the following formula (VII) are preferable cationic starches.



B represents a starch residual group, R₁₇ represents an alkylene group or a hydroxyalkylene group, R₁₈, R₁₉, and R₂₀ may be the same or different and represent alkyl groups, aryl groups, aralkyl groups, each having not more than 10 carbon atoms, or may form a heterocycle together with the nitrogen atom, X₂ represents an anionic ion (chlorine, bromine, iodine, sulfuric acid, sulfonic acid, methyl sulfate, phosphoric acid, nitric acid, and the like), and e is a positive integer.

A preferable range of the cation substitution degree of cationic starch is 0.01 to 1. Specifically, cationic starches having 0.01 to 1, preferably 0.02 to 0.5, cationic group per anhydrous glucose unit are desirable. A substitution degree of below 0.01 is not sufficient. The value not more than 1 is preferable in view of the reaction yield, although the value above 1 can be acceptable.

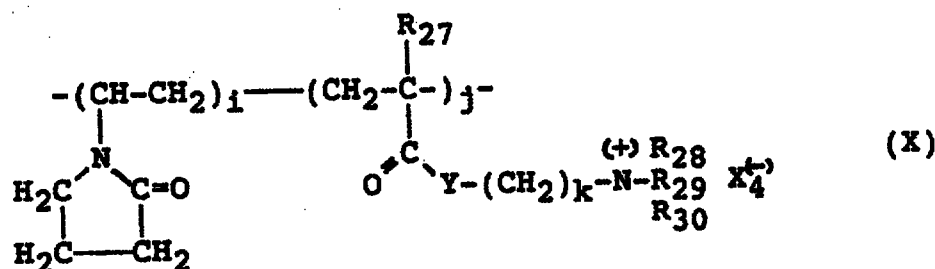
The compounds represented by the following formula (VIII) or (IX) are preferable as a cationic diallyl quaternary ammonium salt/acryl amide copolymer.



wherein R_{21} and R_{22} may be the same or different and represent hydrogen atoms, alkyl groups having 1 to 18 carbon atoms, phenyl groups, aryl groups, hydroxyalkyl groups, amidoalkyl groups, cyanoalkyl groups, alkoxyalkyl groups, or carboalkoxyalkyl groups, R_{23} , R_{24} , R_{25} , and R_{26} may be the same or different and represent hydrogen atoms, lower alkyl groups having 1 to 3 carbon atoms, or phenyl groups, X_3 represents an anionic ion (chlorine, bromine, iodine, sulfuric acid, sulfonic acid, methyl sulfate and nitric acid), f is an integer of 1 to 50, g is an integer of 1 to 50, and h is an integer of 150 to 8,000.

The molecular weight of a diallyl quaternary ammonium salt/acryl amide copolymer is in the range of 30,000 to 2,000,000, and preferably of 100,000 to 1,000,000.

The compounds represented by the following formula (X) are preferable as a quaternarized polyvinylpyrrolidone derivative.

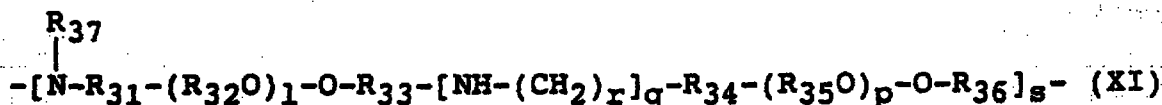


wherein R_{27} represents a hydrogen atom or a lower alkyl group having 1 to 3 carbon atoms, R_{28} , R_{29} , and R_{30} may be the same or different and represent hydrogen atoms, alkyl groups having 1 to 4 carbon atoms, hydroxyalkyl groups, amidoalkyl groups, cyanoalkyl groups, alkoxyalkyl groups, or carboalkoxyalkyl groups, Y represents an oxygen atom or the NH group of an amide bond, X_4 represents an anionic ion (chlorine, bromine, iodine, sulfuric acid, sulfonic acid, alkyl sulfate of a C_{1-4} carbon atom content, phosphoric acid and nitric acid), k is an integer of 1 to 10, i and j are integers satisfying $i + j = 20$ to 8,000.

A molecular weight of a quaternarized polyvinylpyrrolidone derivative is between 10,000 and 2,000,000, with particularly preferable range being between 50,000 and 1,500,000.

The content of the cationic nitrogen originating from cationic polymer in the above vinyl polymer is 0.004 to 0.2%, and preferably 0.01 to 0.15% based on the vinyl polymer. A sufficient effect cannot be expected from the nitrogen atom content of less than 0.004%. On the other hand, the content of above 0.2% causes the vinyl polymer becoming colored and is disadvantageous in view of economy, even though a good performance can be obtained.

Compounds represented by the formula (XI) are preferable as a polyglycol-polyamine condensate.



wherein R_{31} , R_{33} , R_{34} , and R_{36} represent hydroxyalkylene groups of a C_{2-4} carbon atom content, R_{32} and R_{35} represent alkylene groups of a C_{2-3} carbon atom content, l and p are individually an integer of 10 to 20, q is an integer of 2 to 4, r is an integer of 2 to 6, s is an integer of 1 to 50, R_{37} represents a linear or branched alkyl group of a C_6-20 carbon atom content.

A copolymer of adipic acid and dimethylaminohydroxypropyldiethylenetriamine (Cartaretine®, produced by Sandoz Co., U.S.A.) may also be used as a cationic polymer.

Cationic polymers mentioned above may be used either individually or in combination.

The amount of the (C) component formulated into the detergent composition of this invention is 0.05 to 2% by weight, and particularly preferably 0.1 to 0.8% by weight.

The detergent composition of this invention, when used as a shampoo provides superb hair conditioning effects, such as softness and smoothness after washing, less sticky feeling, easy passage of comb through the hair, less hard or rough feeling as well as easy hair-set performance after drying. The detergent composition also provides a liquid detergent suitable for washing cloths made of keratin fibers such as wool or the like, or made of fine denier fibers, which ensures softness of the cloths after washing.

Other features of the invention will become apparent in the course of the following description of the exemplary embodiments which are given for illustration of the invention and are not intended to be limiting thereof.

EXAMPLES

In the examples below the following test methods were applied to study the performance of detergent compositions.

(1) Organoleptic evaluation:

Onto a bundle of hair (weight: 20 g, length: 15 cm) of a healthy Japanese woman 1 g of a shampoo was applied. After the shampoo was foamed for 1 minute, the hair bundle was rinsed in a stream of water for 30 seconds. Water was removed from the hair bundle with towel to serve it for organoleptic evaluation with respect to softness and stickiness according to the following criterion:

Evaluation	Stickiness	Softness
AAA	Not sticky Dry	-
BBB	Not sticky	Soft
CCC	Slightly sticky	Slightly soft
DDD	Sticky	Not soft

(2) Passage of comb through the hair

Human hair weighing 30 g was washed in 10 cc of an aqueous solution of a shampoo composition (concentration: 10%) at 40°C for 30 seconds under shaking. The hair was washed in a water stream for 1 minute, squeezed to remove water, and set to a strain gauge to measure the force applied when combed to

obtain a combing force at moistured conditions. Another bundle of hair treated with the same shampoo composition was washed in a water stream, squeezed to remove water, dried with a dryer, and left for overnight in a thermostat container at 25°C and 65% relative humidity. This bundle of hair was et to a strain gauge to measure the force applied when combed to obtain a combing force at dried conditions. The smaller the load, is easier the combing.

(3) Hair-fly

The same hair used for the measurement of combing force at dried conditions was used for the test, in which the state of hair under electrostatic conditions was observed by naked eyes.

AAA: No hair-fly was occurred

BBB: Occurrence of hair-fly was observed

Example 1

Shampoo compositions listed in Table 1 were prepared and submitted to organoleptic evaluation, evaluation of combing easiness, and of hair-fly. The results are shown in Table 1, in which figures for the composition formulation designate % by weight. Each composition contained, besides components listed in the table, following components:

Diethanolamide laurate	3%
Perfumes	small amount
Water	balance

As evident from Table 1, shampoos to which cationic polymers or linear quaternary ammonium salts are formulated exhibited only insufficient conditioning effects, while, on the other hand, shampoos to which branched quaternary ammonium salts according to the present invention are formulated exhibited superior performances.

TABLE 1

	Comparative Composition						Invention Composition					
	1	2	3	4	5	6	1	2	3	4	5	6
Sodium polyoxyethylene (2.5) lauryl sulfate	20	10	20	20	20	10	20	15	20	20	15	20
Imidazoline-type amphoteric surface active agent * 1		10				10		5			5	
Cationic polymer * 2	0.3	0.3										
Cationic polymer * 3			0.3									
Cetyltrimethylammonium chloride				0.3								
Stearyltrimethylammonium chloride					0.3	0.3						
Dialkyldimethylammonium chloride * 4							0.3	0.3				
2-Octyldodecyltrimethylammonium chloride									0.3			
2-Decyltetradecyltrimethylammonium chloride										0.3	0.3	
2-Dodecylhexadecyltrimethylammonium chloride												0.3

TABLE 1 (continued)

	Comparative Composition						Invention Composition					
	1	2	3	4	5	6	1	2	3	4	5	6
<u>Organoleptic evaluation</u>												
Stickyness	DDD	DDD	CCC	CCC	CCC	CCC	BBB	BBB	BBB	BBB	BBB	AAA
Softness	CCC	CCC	DDD	DDD	DDD	DDD	BBB	BBB	BBB	BBB	BBB	BBB
<u>Passage of comb</u>												
Moistured (g)	287	291	314	315	320	318	226	230	217	213	221	208
Dried (g)	185	190	192	205	204	207	142	144	136	130	132	129
Hair-fly	X	X	X	X	X	X	0	0	0	0	0	0

* 1 Miranol C2⁽²⁾ conc. (manufactured by Miranol Co.)

* 2 Polymer JR-400⁽⁴⁾ (cationic cellulose, produced by Union Carbide, Inc.)

* 3 Marcoat 550⁽²⁾ (copolymer of N,N-dimethyl-3,5-methylenepiperidinium chloride and acryl amide, produced by Merck, Inc.)

* 4 Branched quaternary ammonium salt derived from commercially available oxo alcohol (a mixture of Dovalol 25⁽²⁾ and Dovalol 45⁽²⁾, both produced by Mitsubishi Petrochemical Co. Ltd., at a weight ratio of 50/50), having a C₁₂₋₁₅ carbon atom content with a branched degree of 0.2.

55 Example 2

Shampoo compositions listed in Table 2 were prepared and submitted to organoleptic evaluation, and evaluation of hair-fly. The results are shown in Table 2, in which figures for the composition formulation

designate % by weight. Each composition contained, besides components listed in the table, following components:

Diethanolamide laurate	3%
Perfumes	small amount
Water	balance
pH of formulated shampoo composition	7.0

TABLE 2

	Invention Composition									
	7	8	9	10	11	12	13	14	15	16
Sodium polyoxyethylene (2.5) lauryl sulfate							15			10
Triethanolamine polyoxyethylene (2.5) lauryl sulfate	20							15		
Triethanolamine lauryl sulfate		20							10	
Sodium α -olefin sulfonate			20							5
Sodium lauroyl-N-methyl- β -alanine				20			5		5	
Imidazoline-type amphoteric surface active agent * 1					20				5	5
Amidobetaine-type amphoteric surface active agent * 5						20		5		
Dialkyldimethylammonium chloride * 4							0.5	0.5	0.5	0.5
2-Dodecylhexadecylammonium chloride										

TABLE 2 (Continued)

	Invention Composition									
	7	8	9	10	11	12	13	14	15	16
<u>Organoleptic evaluation</u>										
Stickyness	AAA	AAA	AAA	AAA	AAA	AAA	BBB	BBB	BBB	BBB
Softness	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
<u>Hair-fly</u>	0	0	0	0	0	0	0	0	0	0

* 1 Miranol C2M conc. (manufactured by Miranol Co.)

* 4 Branched quaternary ammonium salt derived from commercially available oxo alcohol (a mixture of Dovanol 23 and Dovanol 45, both produced by Mitsubishi Petrochemical Co. Ltd., at a weight ratio of 50/50, having a C₁₂₋₁₅ carbon atom content, with a branched degree of 0.2

* 5 Revon 2000 (manufactured by Sanyo chemical Co. Ltd.)

As evident from Table 2, branched quaternary ammonium salts contributed to superior performances of shampoos, exhibiting excellent mutual solubility with various anionic or amphoteric surface active agents.

Example 3

Shampoo compositions listed in Table 3 were prepared and their performances were evaluated. The results are shown in Table 3, in which figures for the composition formulation designate % by weight. Each composition contained, besides components listed in the table, following components:

Diethanolamide laurate	3%
Perfumes	small amount
Water	balance
pH of formulated shampoo composition	7.0

TABLE 3

	Comparative Composition							Inventive Composition						
	7	8	9	10	17	18	19	20	21	22	23	24		
Triethanolamine polyoxyethylene (2.5) lauryl sulfate	18	18	18	18	18	18	18	18	18	18	18	18		
Dialkyldimethylammonium chloride * 4	0.01	5			0.05	0.5	1	2	3	4				
2-Octyldodecyltrimethyl ammonium chloride			0.01	5							0.05	4		
<u>Organoleptic evaluation</u>														
Stickyness	BBB	DDD	BBB	DDD	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
Softness	CCC	BBB	CCC	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
Hair-fly	X	0	X	0	0	0	0	0	0	0	0	0	0	0

* 4 Branched quaternary ammonium salt derived from commercially available oxo alcohol (a mixture of ^(A) Dovanol 23 and Dovanol 45, both produced by Mitsubishi Petrochemical Co. Ltd., at a weight ratio of 50/50, having a C₁₂₋₁₅ carbon atom content with a branched degree of 0.2.

Table 3 demonstrates that with the amount of formulation of a branched quaternary ammonium salt at less than 0.05% by weight, the conditioning effect is low, while the amount exceeding 4.0% by weight caused stickiness and impaired passage of fingers through the hair.

Example 4

Shampoo compositions listed in Tables 4-1 and 4-2 were prepared and their organoleptic feeling, passage of comb, and hair-fly were evaluated. The results are shown in Tables 4-1 and 4-2, in which figures for the composition formulation designate % by weight. Each composition contained, besides components listed in the table, following components:

Diethanolamide laurate	3%
Perfumes	small amount
Water	balance
pH of formulated shampoo composition	7.0

TABLE 4-1

	Comparative Composition					Invention Composition				
	11	12	13	14	15	25	26	27	28	
N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylenediamine triethylammonium	20		10	10		20	20	20	20	
N-lauroyl-N-(2-hydroxyethyl)-N',N'-bis(carboxymethyl)-ethylenediamine triethylammonium		20			10					
Polyoxyethylene (2.5) lauryl sulfate triethylammonium			10	10	10					
Cationic polymer 1 * 1	0.5	0.5				0.3	0.3	0.3	0.3	0.3
Cationic polymer 2 * 2			0.5							
Cationic polymer 3 * 3				0.5						
Cationic polymer 4 * 4					0.5					
Dialkyldimethylammonium chloride * 5						0.2				
2-Octyldodecyltrimethyl ammonium chloride							0.2			
2-Decyltetradecyltrimethyl ammonium chloride								0.2		
2-Dodecylhexadecyltrimethyl ammonium chloride									0.2	

TABLE 4-1 (continued)

	Comparative Composition					Invention Composition				
	11	12	13	14	15	25	26	27	28	
<u>Organoleptic evaluation</u>										
Stickyness	DDD	DDD	CCC	CCC	CCC	BBB	BBB	BBB	AAA	
Softness	CCC	CCC	DDD	DDD	DDD	BBB	BBB	BBB	BBB	
<u>Passage of comb</u>										
Moistured	298	306	322	319	327	231	227	229	214	
Dried	187	192	205	200	203	143	138	132	125	
<u>Hair-fly</u>	X	X	X	X	X	0	0	0	0	

TABLE 4-2

	Invention Composition										
	29	30	31	32	33	34	35	36	37		
N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylendiamine triethylammonium	10	10	10			10	10	5	5		
N-lauroyl-N-(2-hydroxyethyl)-N',N'-bis(carboxymethyl)-ethylendiamine triethylammonium				10	20						
Polyoxyethylene (2.5) lauryl sulfate triethylammonium	10	10	10	10		10	10	15	15		
Cationic polymer 1 * 1				0.3	0.3	0.1	0.1	0.7	0.7		
Cationic polymer 2 * 2	0.3										
Cationic polymer 3 * 3		0.3									
Cationic polymer 4 * 4			0.3								
Dialkyldimethylammonium chloride * 5				0.2							
2-Dodecylhaexadecyltrimethyl-ammonium chloride	0.2	0.2	0.2	0.2	0.2	0.05	0.5	0.05	0.3		

TABLE 4-2 (continued)

	Invention Composition									
	29	30	31	32	33	34	35	36	37	
<u>Organoleptic evaluation</u>										
Stickyness	AAA	AAA	AAA	BBB	BBB	BBB	AAA	BBB	AAA	
Softness	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	
<u>Passage of comb</u>										
Moistured (g)	225	230	219	234	241	250	232	205	200	
Dried (g)	127	137	132	141	136	146	133	119	114	
Hair-fly	0	0	0	0	0	0	0	0	0	

* 1 Polymer JR-400 (cationic cellulose, produced by Union Carbide, Inc.)

* 2 A cationic starch

* 3 Marcoat 550 (copolymer of N,N-dimethyl-3,5-methylenepiperidinium chloride and acryl amide, produced by Merck, Inc.)

* 4 Quaternized ethyl sulfate of vinylpyrrolidone-dimethylaminoethyl acrylate copolymer (Gufcoat 755N, produced by Guf Co.)

* 4 Branched quaternary ammonium salt derived from commercially available oxo alcohol (a mixture of Dovalol 25 and Dovalol 45, both produced by Mitsubishi Petrochemical Co. Ltd., at a weight ratio of 50/50), having a C₁₂₋₁₅ carbon atom content, with a branched degree of 0.2.

Example 5

Shampoo compositions of the following formulations were prepared and subjected to organoleptic evaluation by ten women with long hairs. The results are shown in Table 5.

Shampoo A (Invention Product):	
Component	% by weight
Sodium N-lauroyl-N'-carboxymethyl -N'-(2-hydroxyethyl)ethylenediamine	15
Diethanolamide laurate	3
Cationic polymer (Polymer JR-400®; manufactured by Union Carbide Corp.)	0.3
2-Dodecylhexadecyltrimethyl ammonium chloride	0.2
Antiseptics	0.1
Perfumes	0.4
Coloring agent	small amount
Water	balance
pH	7

Shampoo B (comparative Product):	
Component	% by weight
Sodium N-lauroyl-N'-carboxymethyl -N'-(2-hydroxyethyl)ethylenediamine	15
Diethanolamide laurate	3
Cationic polymer (Polymer JR-400®; manufactured by Union Carbide Corp.)	0.3
Antiseptics	0.1
Perfumes	0.4
Coloring agent	small amount
Water	balance
pH	7

TABLE 5

	Shampoo A was better	Shampoo B was better	Could not tell difference
Amount of foam	3	2	5
Finger passage through the hair	6	2	2
Smoothness after rinse	8	2	0
Softness after rinse	7	3	0
Brushing easiness while blow drying	9	1	0
Easiness of hair-set after drying	9	1	0
Comb passage through the hair after drying	8	1	1

Example 6 - 7

Shampoo compositions having following formulations were prepared. All these compositions produced abundant foam, removed dirt efficiently, and provided an excellent soft feeling after hair-washing.

Example 6

Shampoo:	
Component	% by weight
Triethanolamine lauryl sulfate	16
Sodium lauroylsarcosine	3
Diethanol amide laurate	2
2-Decyltetradecyltrimethylammonium chloride	0.5
Antiseptics	0.1
Perfumes, Coloring agents	(appropriate amount)
Water	balance
	100

Example 7

Shampoo:	
Component	% by weight
Sodium polyoxyethylene (3.0) lauryl sulfate	7
Carbobetaine	5
Sodium lauroyl-N-methyl- β -alanine	2
Cationic polymer (Polymer JR-400®; manufactured by Union Carbide Corp.)	0.2
2-Dodecylhexadecyltrimethylammonium chloride	0.4
Antiseptics	0.1
Perfumes, Coloring agents	(appropriate amount)
Water	balance
	100

Examples 8 - 11

Shampoos having the following formulations exhibited only very weak stimulus to the skin and provided a soft finished feeling after washing.

Example 8

Component	% by weight
Sodium N-lauroyl-N-(2-hydroxyethyl)-N',N'-bis(carboxyethyl) ethylenediamine	12
Sodium polyoxyethylene (2.5) lauryl ether sulfate	5
Diethanolamide laurate	3
Cationic polymer (Marcoat 550®; produced by Merck Co.)	0.2
2-Decyltetradecyltrimethylammonium chloride	0.2
Antiseptics	0.1
Perfumes, Coloring agents	(appropriate amount)
Water	balance
	100

Example 9

Component	% by weight
N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl)-ethylenediamine triethanolamine	3
Lauryl ether sulfate triethanolamine	15
Diethanolamide laurate	2
Cationic polymer (Polymer JR-400®; manufactured by Union Carbide Corp.)	0.6
Dialkyldimethylammonium chloride	0.1
Antiseptics	0.1
Perfumes, Coloring agents	(appropriate amount)
Water	balance
	100

Example 10

Component	% by weight
N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl)-ethylenediamine triethanolamine	18
Polyoxyethylene (2.5) lauryl ether sulfate triethanolamine	5
Ethanolamine salt of 1-hydroxy-4-methyl-6-(2,4,4-trimethylphenyl)-2(1H)-pyridinone (Octopyrox®)	1
Cationic polymer (Polymer JR-400®; manufactured by Union Carbide Corp.)	0.1
2-Dodecylhexadecyltrimethylammonium chloride	0.2
Methyl cellulose	0.3
Antiseptics	0.1
Perfumes, Coloring agents	(appropriate amount)
Water	balance
	100

Example 11

Component	% by weight
Sodium N-lauroyl-N-(2-hydroxyethyl)-N',N'-bis(carboxyethyl) ethylenediamine	0.8
Sodium polyoxyethylene (3.0) lauryl ether sulfate	18
Cationic polymer (Gafcoat 755N®, produced by Guf Co.)	0.4
2-Dodecylhexadecyltrimethylammonium chloride	0.3
Antiseptics	0.1
Pearling agents	5
Perfumes, Coloring agents	appropriate amount
Water	balance
	100

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.



Claims

1. A detergent composition characterized in that it comprises:

(A) 0.1 to 40 % by weight of at least one kind of anionic or amphoteric surface active agents selected from the following (1) to (5):

(1) Alkyl- or alkenyl ether sulfates having a linear or branched, alkyl or alkenyl group of an average carbon atom content of 10 to 20 and having, in a molecule, 0.5 to 8 mols of ethylene oxide adduct, propylene oxide adduct, butylene oxide adduct, ethylene oxide-propylene oxide adduct with a ratio of ethylene oxide/propylene oxide being 0.1/9.9 to 9.9/0.1, or ethylene oxide-butylene oxide adduct with a ratio of ethylene oxide/butylene oxide being 0.1/9.9 to 9.9/0.1,

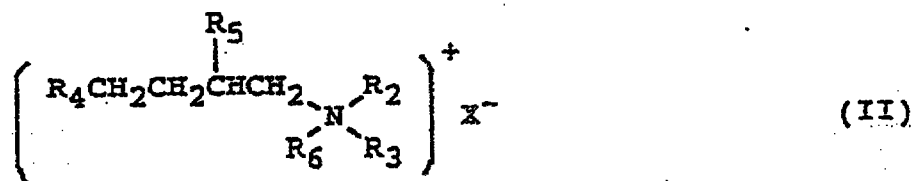
(2) Alkyl- or alkenyl sulfates having an alkyl or alkenyl group of an average carbon atom content of 10 to 20,

(3) Olefin sulfonates having an average carbon atom content of 10 to 20 in a molecule,

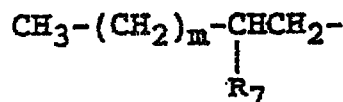
(4) Saturated or unsaturated fatty acids having an average carbon atom content of 10 to 24, and

(5) Imidazoline-type amphoteric surface active agents of α -position addition-type, secondary amido-type amphoteric surface active agents, or tertiary amido-type amphoteric surface active agents, having an alkyl, alkenyl, or acyl group of an 8 to 24 carbon atom content;

(B) 0.05 to 4% by weight of at least one kind of quaternary ammonium salts represented by the following formula (I) or (II):



wherein R_1 represents a mixture of (a) a branched alkyl group represented by



and (b) a linear alkyl group represented by $CH_3-(CH_2)_n-$ (wherein R_7 represents a methyl or ethyl group, m is an integer to make the carbon atom content of the branched alkyl group to 8 to 16, and n is an integer of 7 to 15), with a ratio (a)/(a) + (b) being 0.1 to 1, R_2 and R_3 independently represent an alkyl group having 1 to 3 carbon atoms, or a hydroxyalkyl group having 1 to 3 carbon atoms, R_4 and R_5 independently represent an alkyl group having 2 to 12 carbon atoms, R_6 represents a group



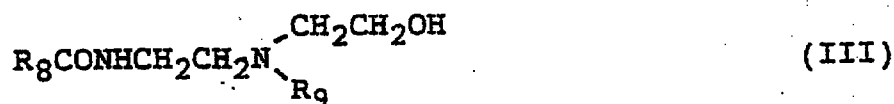
or an alkyl group having 1 to 3 carbon atoms, and X^- represents a halogen ion or an organic anion.

2. A detergent composition according to Claim 1, comprising in addition to said components (A) and (B) (C) 0.05 to 2% by weight of at least one cationic polymer selected from the group consisting of cationized cellulose derivatives, cationic starch, copolymers of a diallyl quaternary ammonium salt



and an acrylamide, quaternarized polyvinylpyrrolidone derivatives, and polyglycol-polyamine condensates.

3. The detergent composition according to Claim 2, wherein 0.1 to 25% by weight, based on said detergent composition, of said (A) component is one or more amidoamine-type amphoteric surface active agents represented by the following formula (III) or (IV):



wherein R_8 and R_{10} each independently represent a saturated or unsaturated hydrocarbon group having 7 to 19 carbon atoms, R_9 and R_{11} each independently represent a group $-CH_2COOM$ or $-CH_2CH_2COOM$ (wherein M stands for a hydrogen atom, an alkali metal, or an alkanol amine), R_{12} represents a hydrogen atom, a group $-CH_2COOM$, or a group $-CH_2CH_2COOM$ (wherein M has the same meaning as defined above).

Patentansprüche

1. Detergens-Zusammensetzung, dadurch gekennzeichnet, daß sie umfaßt:

(A) 0,1 bis 40 Gew.-% mindestens einer Art anionischer oder amphoterer oberflächenaktiver Mittel, die aus den folgenden (1) bis (5) ausgewählt sind:

(1) Alkyl- oder Alkenylethersulfate, die eine lineare oder verzweigte Alkyl- oder Alkenylgruppe mit einem durchschnittlichen Kohlenstoffatomgehalt von 10 bis 20 aufweisen und 0,5 bis 8 Mol Ethylenoxid-Addukt, Propylenoxid-Addukt, Butylenoxid-Addukt, Ethylenoxid-Propylenoxid-Addukt mit einem Verhältnis von Ethylenoxid/Propylenoxid, das 0,1/9,9 bis 9,9/0,1 beträgt, oder Ethylenoxid-Butylenoxid-Addukt mit einem Verhältnis von Ethylenoxid/Butylenoxid, das 0,1/9,9 bis 9,9/0,1 beträgt, in einem Molekül aufweisen,

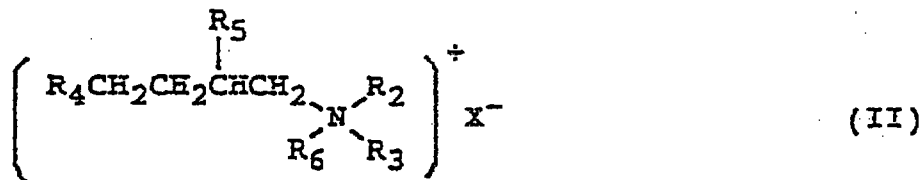
(2) Alkyl- oder Alkenylsulfate mit einer Alkyl- oder Alkenylgruppe mit einem durchschnittlichen Kohlenstoffatomgehalt von 10 bis 20,

(3) Olefinsulfonate mit einem durchschnittlichen Kohlenstoffatomgehalt von 10 bis 20 in einem Molekül,

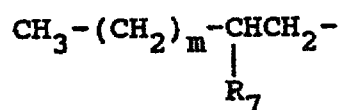
(4) gesättigte oder ungesättigte Fettsäuren mit einem durchschnittlichen Kohlenstoffatomgehalt von 10 bis 24 und

(5) amphotere Imidazolin-artige oberflächenaktive Mittel vom α -Stellung-Additionstyp, amphotere oberflächenaktive Mittel vom sekundären Amido-Typ oder amphotere oberflächenaktive Mittel vom tertiären Amido-Typ mit einer Alkyl-, Alkenyl- oder Acylgruppe mit einem Kohlenstoffatomgehalt von 8 bis 24;

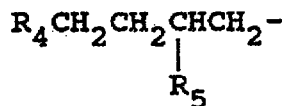
(B) 0,05 bis 4 Gew.-% mindestens einer Art quarternärer Ammoniumsalze, die durch die folgende Formel (I) oder (II) dargestellt werden:



worin R_1 eine Mischung (a) einer verzweigten Alkylgruppe, die durch



dargestellt wird und (b) einer linearen Alkylgruppe, die durch $CH_3 - (CH_2)_n -$ dargestellt wird (worin R_7 eine Methyl- oder Ethylgruppe darstellt, m eine ganze Zahl ist, so daß der Kohlenstoffatomgehalt der verzweigten Alkylgruppe 8 bis 16 beträgt, und n eine ganze Zahl von 7 bis 15 ist) in einem Verhältnis von (a)/(a) + (b), das 0,1 bis 1 beträgt, ist, R_2 und R_3 unabhängig eine Alkylgruppe mit 1 bis 3 Kohlenstoffatomen oder eine Hydroxyalkylgruppe mit 1 bis 3 Kohlenstoffatomen darstellen, R_4 und R_5 unabhängig eine Alkylgruppe mit 2 bis 12 Kohlenstoffatomen darstellen, R_6 eine Gruppe

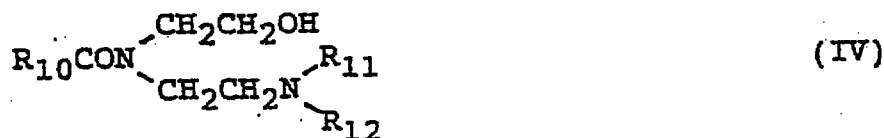
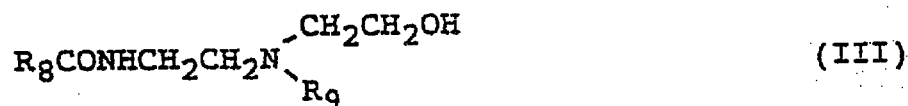


oder eine Alkylgruppe mit 1 bis 3 Kohlenstoffatomen darstellt und X^- ein Halogenion oder ein organisches Anion darstellt.

2. Detergens-Zusammensetzung nach Anspruch 1, die zusätzlich zu den Komponenten (A) und (B) umfaßt:

(C) 0,05 bis 2 Gew.-% mindestens eines kationischen Polymers, das aus der Gruppe ausgewählt ist, die aus kationisierten Cellulose-Derivaten, kationischer Stärke, Copolymeren eines quaternären Diallammoniumsalses und eines Acrylamids, quaternisierten Polyvinylpyrrolidon-Derivaten und Polyglykol-Polyamin-Kondensaten besteht.

3. Detergens-Zusammensetzung nach Anspruch 2, in der 0,1 bis 25 Gew.-%, bezogen auf die Detergens-Zusammensetzung, der Komponente (A) ein oder mehrere amphotere oberflächenaktive Mittel vom Amidoamin-Typ sind, dargestellt durch die folgende Formel (III) oder (IV):



worin R_8 und R_{10} jeweils unabhängig eine gesättigte oder ungesättigte Kohlenwasserstoffgruppe mit 7 bis 19 Kohlenstoffatomen darstellen, R_9 und R_{11} jeweils unabhängig eine Gruppe $-\text{CH}_2\text{COOM}$ oder $-\text{CH}_2\text{CH}_2\text{COOM}$ darstellen (worin M für ein Wasserstoffatom, ein Alkalimetall oder ein Alkanolamin steht), R_{12} ein Wasserstoffatom, eine Gruppe $-\text{CH}_2\text{COOM}$ oder eine Gruppe $-\text{CH}_2\text{CH}_2\text{COOM}$ darstellt (worin M die gleiche Bedeutung wie oben definiert aufweist).

20 Revendications

1. Composition détergente, caractérisée par le fait qu'elle comprend :

(A) 0,1 à 40% en poids d'au moins une sorte d'agents tensioactifs anioniques ou amphotères, choisis parmi les suivants (1) à (5) :

(1) Alkyl- ou alcényléther sulfates, ayant un groupe alkyle ou alcényle, linéaire ou ramifié, d'une teneur moyenne en atomes de carbone de 10 à 20, et ayant, dans une molécule, 0,5 à 8 moles de produit d'addition d'oxyde d'éthylène, de produit d'addition d'oxyde de propylène, de produit d'addition d'oxyde de butylène, de produit d'addition d'oxyde d'éthylène - oxyde de propylène avec un rapport d'oxyde d'éthylène/oxyde de propylène qui est de 0,1/9,9 à 9,9/0,1, ou de produit d'addition oxyde d'éthylène - oxyde de butylène avec un rapport d'oxyde d'éthylène/d'oxyde de butylène qui est de 0,1/9,9 à 9,9/0,1 ;

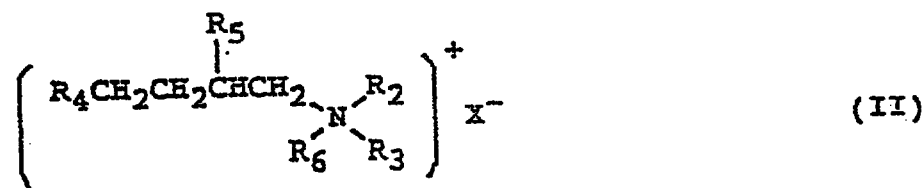
(2) Alkyl- ou alcényl sulfates, ayant un groupe alkyle ou alcényle d'une teneur moyenne en atomes de carbone de 10 à 20 ;

(3) Oléfine sulfonates, ayant une teneur moyenne en atomes de carbone de 10 à 20 dans une molécule ;

(4) Acides gras saturés ou insaturés, ayant une teneur moyenne en atomes de carbone de 10 à 24 ; et

(5) Agents tensio-actifs amphotères de type imidazoline, de type à addition en position α , agents tensio-actifs amphotères de type amido secondaire, ou agents tensio-actifs amphotères de type amido tertiaire, ayant un groupe alkyle, alcényle ou acyle d'une teneur en atomes de carbone de 8 à 24 ;

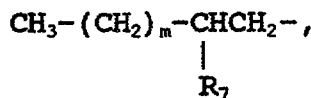
(B) 0,05 à 4% en poids d'au moins une sorte de sels d'ammonium quaternaire, représentés par la formule (I) ou (II) suivante :





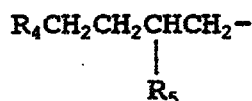
où :

- R₁ représente un mélange de (a) un groupe alkyle ramifié, représenté par



et (b) un groupe alkyle linéaire, représenté par CH₃-(CH₂)_n (où R₇ représente un groupe méthyle ou éthyle, m est un entier pour rendre la teneur en atomes de carbone du groupe alkyle ramifié d'une valeur de 8 à 16, et n est un entier de 7 à 15), avec un rapport (a)/(a) + (b) qui est de 0,1 à 1 ;

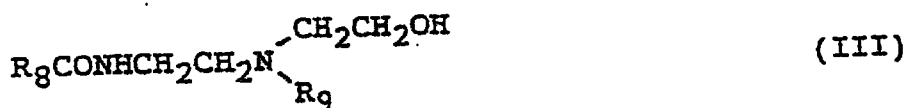
- R₂ et R₃ représentent indépendamment un groupe alkyle ayant 1 à 3 atomes de carbone, ou un groupe hydroxyalkyle ayant 1 à 3 atomes de carbone ;
- R₄ et R₅ représentent indépendamment un groupe alkyle ayant 2 à 12 atomes de carbone ;
- R₆ représente un groupe



ou un groupe alkyle ayant 1 à 3 atomes de carbone ; et

- X⁻ représente un ion halogène ou un anion organique.

- Composition détergente selon la revendication 1, comprenant, en plus desdits composants (A) et (B) : (C) 0,05 à 2% en poids d'au moins un polymère cationique choisi dans le groupe constitué par les dérivés de cellulose cationisés, l'amidon cationique, les copolymères d'un sel de diallyl ammonium quaternaire et d'un acrylamide, les dérivés de polyvinylpyrrolidone quaternisés, et les condensats polyglycol-polyamine.
- Composition détergente selon la revendication 2, dans laquelle 0,1 à 25% en poids, sur la base de ladite composition détergente, dudit composant (A) sont constitués par un ou plusieurs agents tensio-actifs amphotères de type amidoamine, représentés par la formule (III) ou (IV) suivante :



où :

- R₈ et R₁₀ représentent chacun indépendamment un groupe hydrocarboné saturé ou insaturé, ayant 7 à 19 atomes de carbone ;
- R₉ et R₁₁ représentent chacun indépendamment un groupe -CH₂COOM ou -CH₂CH₂COOM (où M désigne un atome d'hydrogène, un métal alcalin ou une alcool amine) ;
- R₁₂ représente un atome d'hydrogène, un groupe -CH₂COOM ou un groupe -CH₂CH₂COOM (où M a la même signification que celle définie ci-dessus).