

TITLE OF THE INVENTIONDETERGENT COMPOSITIONBACKGROUND OF THE INVENTIONField of the Invention:

The present invention relates to a detergent composition comprising specific detergent surfactants and silicone having a specific viscosity, and, more particularly, to a detergent composition comprising an amidoamine amphoteric surfactant, a sulfosuccinate surfactant, and a non-volatile silicone. It possesses high lathering capability and excellent detergency, is only slightly irritant to the skin and the eye, and provides excellent hair conditioning effects; e.g. easy hair-setting and combing through the hair after drying. The detergent composition is suitable for use as a shampoo, a light-duty detergent for fine fabrics such as wools, and the like.

Description of the Background Art:

Anionic surfactants such as alkylsulfates, polyoxyethylenealkyl sulfates, alkylbenzene sulfonates, α -olefin sulfonates, and the like have conventionally been used as surfactants for detergent compositions. All of them are, however, more or less irritant to the skin. Continued use of a detergent composition containing these surfactants results in chapped skin. On the other hand, amidoamine surfactants are known as excellently mild surfactants with

low irritation to the skin and the eye, and thus have been used as a component for detergent compositions.

However, since amidoamine surfactants are inferior in the detergency, lathering capability, thickening effect, and conditioning effect, all of which are essential characteristics for a detergent composition, they can scarcely be used as a major surfactant for detergent compositions. Development of a detergent composition making the best use of the advantageous characteristics of amidoamine surfactants has been desired.

Sulfosuccinate surfactants are also known to be excellently mild to the skin. However, since sulfosuccinate surfactants have poor lathering capability and exhibit only an insufficient thickening effect, they are seldom used as a major surfactant component of detergent compositions and have been used merely as an auxiliary component. The use of such sulfosuccinate surfactant as a detergent component has been disclosed, for example, in Japanese Patent Publication No. 43,276/1981 which proposed a combined use of a sulfosuccinate surfactant with a conventional imidazoline amphoteric surfactant or alkylbetaine amphoteric surfactant and an N-acylamino acid salt-type anionic surfactant.

Japanese Patent Publication No. 43,479/1987 discloses a detergent composition using an ammonium sulfate of secondary alcohol ethoxylate in combination with a sulfosuccinic acid half ester of secondary alcohol ethoxylate and alkylalkanolamides and/or alkylamine oxides. Furthermore, a

number of patent applications have been laid-open which disclose detergent or shampoo compositions using a sulfosuccinate surfactant in combination with other detergent components; e.g. Japanese Patent Laid-open Nos. 38,395/1981, 82,895/1981, 82,897/1981, 82,898/1981, 159,897/1982, 102,996/1984, 146,864/1985, 140,514/1986, 109,897/1987, 127,396/1987, 148,599/1987, 164,797/1987, 260,893/1987, and 161,098/1988.

Although these patent applications disclose that compounds of the type used in the present invention are usable as components for detergent compositions, they do not teach nor suggest a detergent composition which make the best use of the advantageous characteristics of a sulfosuccinate surfactant, while satisfying various characteristics such as good lathering capability, excellent detergency, high thickening effect, as well as characteristics of providing a smooth pliable feeling and superb hair conditioning effect to the hair after washing.

Furthermore, Japanese Patent Laid-open No. 84,198/1987 discloses a liquid detergent composition prepared by using a monoester of sulfosuccinic acid in conjunction with a silicone derivative. Even though this patent specification claims that the detergent composition can be improved in the creaminess of lather and lather-lasting capability, the composition actually exhibits only an insufficient hair conditioning effect.

A detergent composition in which a cationic polymer is

incorporated is known to exhibit an improved feeling upon use and a good conditioning effect after washing. However, an addition of such a cationic polymer to a detergent composition in an amount sufficient to exhibit a good conditioning effect and an improved feeling tends to impart a disagreeable sticky feeling while drying the hair and further entails the problem that a complex of the cationic polymer is solidified as it becomes dried, resulting in increased stiffness and hardness.

Shampoo compositions provided with a good conditioning effect by dispersing a hard silicone polymer into an anionic surfactant are disclosed in Japanese Patent Laid-open Nos. 210,022/1986, 13,012/1989, 13,013/1989, and so on. A problem in these shampoo compositions is irritation to the skin due to the anionic surfactant. Their continued use damages hair-setting due to accumulation of hard silicone polymers on the hair.

A desire has, therefore, existed for the development of a detergent composition making the best use of a low irritant surfactant, and yet possessing high lathering capability and excellent detergency, and giving excellent smoothness and pliability to the hair after washing and a superb hair conditioning effect without stickiness after drying.

In view of this situation, the present inventors have conducted extensive studies, and, as a result, found that a detergent composition comprising a specific type of

amidoamine amphoteric surfactant, sulfosuccinate surfactant, and non-volatile silicone exhibited excellent detergency and lathering capability, while maintaining excellent characteristics inherent to amidoamine amphoteric surfactants and sulfosuccinate surfactants, e.g. low irritation to the skin and the eye mucosa. This finding has led to the completion of this invention.

SUMMARY OF THE INVENTION

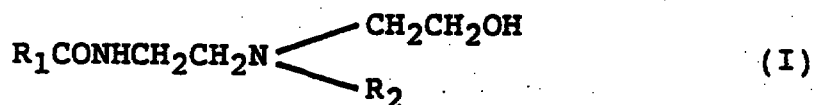
Accordingly, an object of the present invention is to provide a detergent composition comprising:

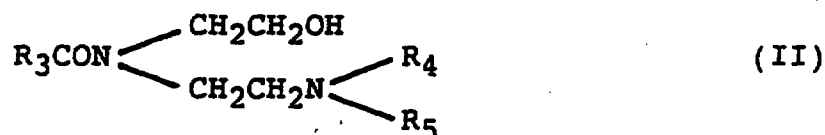
- (A) one or more amidoamine amphoteric surfactants;
- (B) one or more sulfosuccinate surfactants; and
- (C) a non-volatile silicone having a viscosity of 5-15,000,000 cSt at 25°C.

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

Given as examples of amidoamine amphoteric surfactants are compounds represented by the following formulae (I) and (II):





wherein R_1 and R_3 independently represent a saturated or unsaturated hydrocarbon group having 7-19 carbon atoms, R_2 and R_4 independently represent a group $-\text{CH}_2\text{COOM}_1$,

$-\text{CH}_2\text{CH}_2\text{COOM}_1$, or $-\text{CH}_2\underset{\text{OH}}{\text{CH}}\text{CH}_2\text{SO}_3\text{M}_1$, wherein M_1 represents

a hydrogen atom, alkali metal, or an alkanolamine, and R_5 represents a hydrogen atom, a group $-\text{CH}_2\text{COOM}_1$,

$-\text{CH}_2\text{CH}_2\text{COOM}_1$, or $-\text{CH}_2\underset{\text{OH}}{\text{CH}}\text{CH}_2\text{SO}_3\text{M}_1$, wherein M_1 has the same

meaning as defined above.

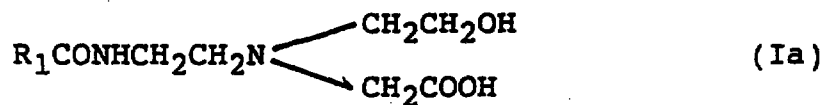
Specific examples of preferable compounds represented by formula (I) are N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylenediamine, N-lauroyl-N'-carboxyethyl-N'-(2-hydroxyethyl)ethylenediamine, N-myristoyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylenediamine, N-myristoyl-N'-carboxyethyl-N'-(2-hydroxyethyl)ethylenediamine, N-palmitoyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylenediamine, N-palmitoyl-N'-carboxyethyl-N'-(2-hydroxyethyl)ethylenediamine, and the like, as well as their salts. Enumerated as specific examples of preferable compounds represented by formula (II) are N-lauroyl-N-(2-hydroxyethyl)-N'-carboxymethyl-ethylenediamine, 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'-carboxymethyl-ethylenediamine, 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'-carboxymethyl-ethylenediamine, N-palmitoyl-N-(2-hydroxyethyl)-N',N'-bis(carboxymethyl)-ethylenediamine, N-palmitoyl-N-(2-hydroxyethyl)-N',N'-bis(carboxyethyl)ethylenediamine, as well as their salts.

The salt may be a salt of an alkali metal, e.g. sodium; a salt of an alkaline earth metal, e.g. magnesium; a salt of alkanolamine, e.g. triethanolamine; or an ammonium salt. Since these salts often contain inorganic salts as impurities, they are desalted to remove a part or all of the inorganic salts to the extent that a content of impurity inorganic salts is less than 1% by weight to produce purified organic salts.

A desalted amidoamine amphoteric surfactant may be adjusted by means of solvent extraction, electrodialysis, or the like methods. A particularly preferable amidoamine amphoteric surfactant is an ammonium or triethanolamine salt of secondary amidoamino acid of formula (Ia) shown below, in which the content of impurity inorganic salts is less than 1% by weight. By using such an ammonium or triethanolamine salt, a polymer which is soluble in water and insoluble in a concentrated inorganic solution, e.g. in a 2% sodium chloride solution, can easily be incorporated in a detergent

composition in an amount of 0.05-10% by weight.



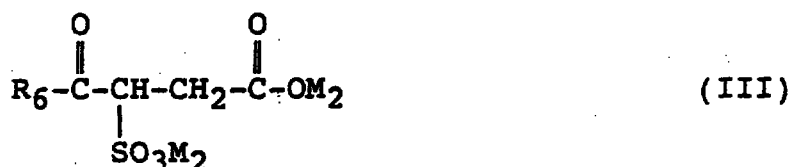
Here, the polymers which are soluble in water and insoluble in a concentrated inorganic solution are, for example, cationic polymers such as cationic cellulose, cationic starch, cationic natural gum, diallyl quaternary ammonium salt homopolymer, and the like, which can provide a conditioning effect to the skin, the hair, or fabrics; anionic polymers such as alginic acid, carboxymethyl cellulose, carboxyvinyl polymer, and the like, which can provide a thickening effect; and nonionic polymers such as hydroxyethyl cellulose, polyvinyl alcohol, polyvinyl pyrrolidone, polyethylene oxide, and the like, which can provide a thickening effect and an excellent feel to the hair and skin.

A process for the preparation of amidoamine amphoteric surfactants used in the present invention are described, for example, in Japanese Patent Laid-open No. 115,512/1985.

The amidoamine amphoteric surfactants can be used singly or as a mixture of one or more of them, and preferably incorporated in the detergent composition of the present invention in an amount of 1-45% by weight, and particularly preferably 5-30% by weight.

Given as examples of sulfosuccinate surfactants, which are component (B) of the present invention, are

sulfosuccinates of higher alcohols or their ethoxylates, or sulfosuccinates derived from higher fatty acid amides represented by formula (III) or (IV):



wherein R_6 represents a group $\text{R}_7-\text{O}-(\text{CH}_2\overset{\text{R}_8}{\underset{|}{\text{CHO}}})_m-$ or

$\text{R}_9\text{CONH}(\text{CH}_2\overset{\text{R}_8}{\underset{|}{\text{CHO}}})_m-$ (wherein R_7 represents a linear or branched alkyl or alkenyl group having 8-22 carbon atoms, R_8 represents a hydrogen atom or a methyl group, R_9 represents a linear or branched alkyl or alkenyl group having 7-21 carbon atoms, and m denotes a value of 0-20), and M_2 represents a hydrogen atom or a cationic ion which can produce a water-soluble salt and is selected from alkali metals, alkaline earth metals, ammonium, and organic ammonium.

Of the compounds represented by formula (III) or (IV), typical sulfosuccinates of higher alcohol or its ethoxylate are disodium salt of sulfosuccinate of a secondary alcohol having 11 to 13 carbons [Softanol/MES 3, 5, 7, 9, 12, (R.T.M.)]

manufactured by NIPPON SHOKUBAI KAGAKU KOGYO CO., LTD (each number denotes an average addition mol of ethylene oxide (EO)]], di-sodium salt of sulfosuccinate of lauryl alcohol or lauryl alcohol ethoxylate (EO=3, 4, 6, 9, 12, Kohacool L-400, etc., manufactured by Toho Chemical Industries Co., Ltd.), di-sodium salt of sulfosuccinate of synthetic primary alcohol with a C₁₂₋₁₅ carbon atom content or its ethoxylate (EO=2-12), di-sodium salt of sulfosuccinate of Guerbet alcohol with a C₈₋₂₂ carbon atom content or its ethoxylate (EO=2-12), and the like. Given as examples of the sulfosuccinates derived from a higher fatty acid amide are di-sodium salt of sulfosuccinate of polyethylene glycol (EO=1, 2) amide laurate, di-sodium salt of sulfosuccinate of polyethylene glycol (EO=1, 2) oleate, di-sodium salt of sulfosuccinate of coconut oil fatty acid polyethylene glycol (EO=4), and the like. Among these, linear higher alcohol mono succinate with a C₁₁₋₁₃ carbon atom content is preferable in view of an agreeable feeling and lathering capability.

These sulfosuccinate surfactants can be used either singly or as a mixture of one or more of them, and preferably incorporated in the detergent composition of the present invention in an amount of 1 to 45% by weight, and particularly preferably 2 to 20% by weight.

The total amount of amidoamine amphoteric surfactants and sulfosuccinate surfactants to be incorporated into the detergent composition of the present invention is preferably

5 to 50% by weight, with 10 to 30% by weight being particularly preferable. The proportion of amidoamine amphoteric surfactants and sulfosuccinate type surfactants may be arbitrarily selected from the range of 1:9 to 9:1. The range of 1:4 to 4:1 is particularly preferable.

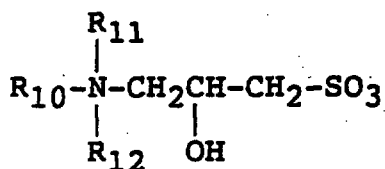
Examples of non-volatile silicone derivatives, component (C) of the present invention, are those having a viscosity of 5-15,000,000 cSt at 25°C, e.g. dimethylpolysiloxane, methylphenylpolysiloxane. These silicone derivatives may be used either singly or as a mixture of two or more of them, and incorporated in the detergent composition of the present invention in an amount of 0.01-10% by weight, preferably 0.5-8% by weight, and particularly preferably 1-5% by weight. If the amount is less than 0.01% by weight, only an insufficient conditioning effect is obtained, while if the amount is greater than 10% by weight, lathering capability is impaired. A mixture of silicone derivatives having various viscosities can be used for the detergent composition of the present invention. From the aspect of a better conditioning effect, silicone derivatives having a viscosity of 5,000-15,000,000 cSt, and particularly 1,000-15,000,000 cSt, singly or as a mixture, are preferable. Volatile silicone derivatives having a viscosity less than 5 cSt provides only an insufficient feeling upon use. Silicone derivatives having a viscosity greater than 15,000,000 cSt are difficult to handle because of the high viscosity. They may be accumulated on the hair

during repeated use, resulting in an impaired hair-setting effect. The viscosity of these silicone derivatives are measured at 25°C by means of a Bruckfield rotary viscometer according to Cosmetic Material Standard, Vol 2, General Experiment, Viscosity Measuring Method No. 2.

In addition to the above essential components, other components commonly used in detergent compositions may optionally be incorporated into the composition of this invention to the extent that the effects of the invention are not impaired. Given as examples of such optional components are lather increasing agents such as anionic surfactants, amphoteric surfactants, and nonionic surfactants; tactile improvers such as salts of higher fatty acid, alkylamine oxides, fatty acid alkanolamides, squalane, lanolin, cationic surfactants, and cationic polymers; humectants such as propylene glycol, glycerol, diethyleneglycol monoethyl ether, and sorbitol; viscosity modifiers such as methyl cellulose, carboxylvinyl polymer, hydroxyethyl cellulose, polyoxyethyleneglycol distearate, and ethanol; pearling agents; perfumes; coloring agents; UV ray absorbers; anti-oxidants; germicides such as trichlosan and trichlorocarbanilide; antiphlogistics such as potassium glytylphosphate, tochopheryl acetate; antidandruff agentssuch as zinc pyrition and octopirox; preservatives such as methyl paraben, butyl paraben; and the like.

Amphoteric surfactants which can be added as an optional components include carbobetaine-, amidobetaine-,

sulfobetaine-, hydroxysulfobetaine-, and amidosulfobetaine amphoteric surfactants having an alkyl, alkenyl, or acyl group with 8-24 carbon atoms. Especially preferable are hydroxysulfobetaine amphoteric surfactants of the formula,

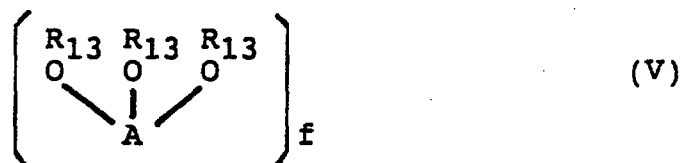


wherein R_{10} is a saturated or unsaturated hydrocarbon having 8-18 carbon atoms, R_{11} and R_{12} individually represent methyl or ethyl group. Specific examples of preferable hydroxysulfobetaines of the above formula are dimethylhydroxysulfobetaine, myristyldimethylhydroxysulfobetaine, palmityldimethylhydroxysulfobetaine, lauryldimethylhydroxysulfobetaine, ethyldimethylhydroxysulfobetaine, myristyldiethylhydroxysulfobetaine, palmityldiethylhydroxysulfobetaine, and the like. A preferable amount of these betaine-type amphoteric surfactants is 0.1-20% by weight, and especially 2-10% by weight.

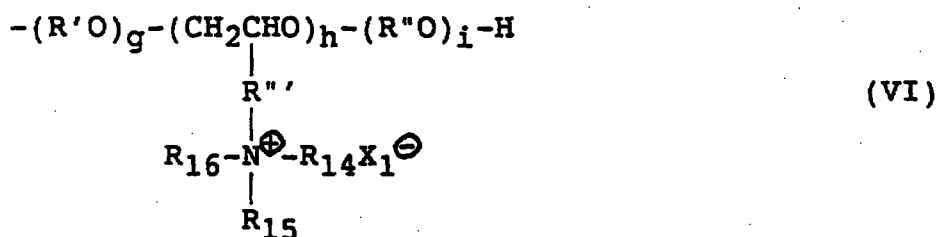
Various cationic polymers can be given which are used as a tactile improver to be added as an optional component to the composition of the present invention. Typical examples are cationized cellulose derivatives, cationic starch, cationic guar-gums, copolymers of diallyl quaternary ammonium salt and acrylamide, quaternarized polyvinylpyrrolidone derivatives, polyglycol-polyamine condensates, and the like. Of these, cationized cellulose

derivatives are particularly preferable.

Compounds of following formula (V) are given as examples of preferred cationized cellulose derivatives:



wherein A represents an anhydrous glucose unit residue, f denotes an integer of 50 to 20,000, and each R_{13} individually represents a group represented by the following formula (VI):

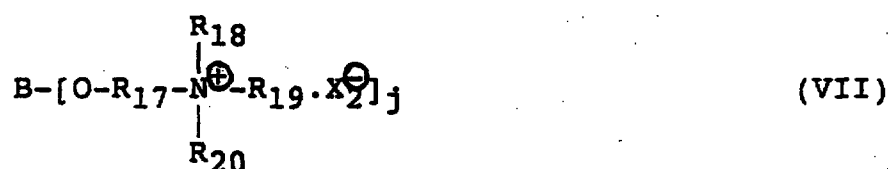


wherein R' and R'' individually represent an alkylene group having 2 or 3 carbon atoms, g is an integer of 0 to 10, h is an integer of 0 to 3, i is an integer of 0 to 10, R'' represents an alkylene group or a hydroxyalkylene group each having 1 to 3 carbon atoms, R_{14} , R_{15} , and R_{16} may be the 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 X_1 represents an anion, e.g. chlorine, bromine, iodine, sulfuric acid, sulfonic acid, methyl sulfonic acid, phosphoric acid, nitric acid, and the like.

A preferable range of the cation substitution degree in

cationized cellulose is 0.01 to 1, i.e., in terms of the average value of h for anhydrous glucose 0.01 to 1, and preferably 0.02 to 0.5. The average of g plus i is 1 to 3. A substitution degree of below 0.01 is not sufficient. The value not more than 1 is preferable from the aspect 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.



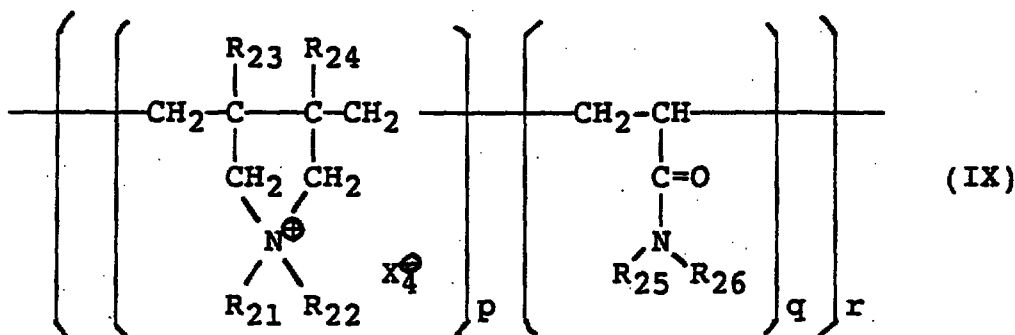
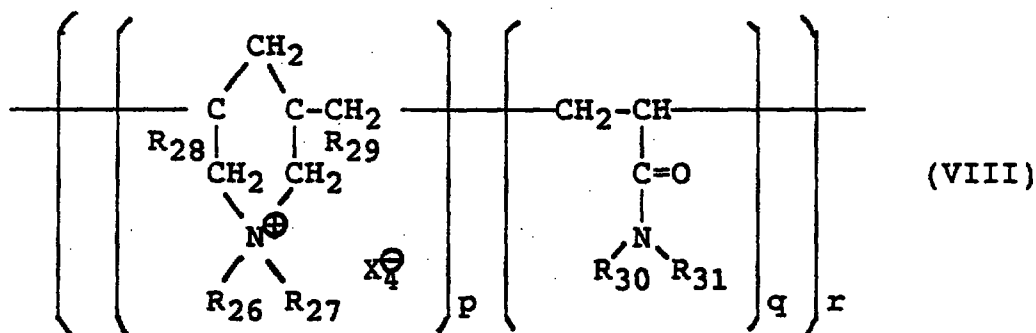
wherein B represents a starch residual group, R_{17} represents an alkylene group or a hydroxyalkylene group, R_{18} , R_{19} , and R_{20} may be the same or different and represent alkyl groups, aryl groups, aralkyl groups, each having not more than 10 carbon atoms, or may form a heterocycle together with the nitrogen atom, X_2 represents an anion, e.g. chlorine, bromine, iodine, sulfuric acid, sulfonic acid, methyl sulfonic acid, phosphoric acid, nitric acid, and the like, and j 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 from the aspect of the reaction yield, although the value above 1 can be acceptable.

Any guar-gum derivatives which are specified in CTFA as guar-hydroxypropyltrimonim chloride can be used for the purposes of the present invention. Examples are the products commercially available under the trade names of Jagual-C-13, Jagual-C-14-S, Jagual-C-15, and Jagual-C-17, (manufactured by Cellanese Stein-Hohl Co.).

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

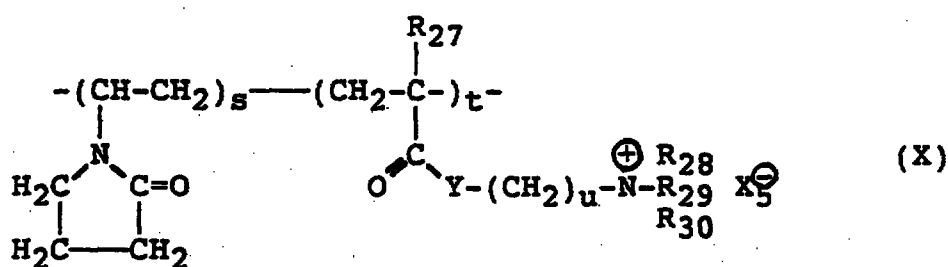


wherein R₂₁ and R₂₂ may be the same or different and

represent hydrogen atoms, alkyl groups having 1 to 18 carbon atoms, phenyl groups, aryl groups, hydroxyalkyl groups, amidealkyl 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_4 represents an anion, e.g. chlorine, bromine, iodine, sulfuric acid, sulfonic acid, methyl sulfonic acid, nitric acid, and the like, p is an integer of 1 to 50, q is an integer of 1 to 50, and r 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.

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



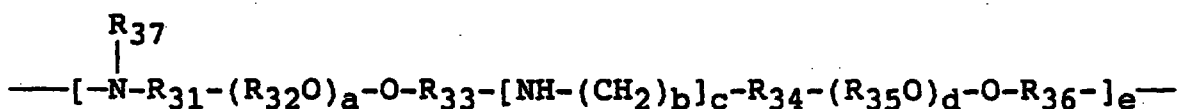
wherein R_{27} represents a hydrogen atom or a lower alkyl group having 1 to 3 carbon atoms, R_{28} , R_{29} , and R_{30} may be the same or different and represent hydrogen atoms, alkyl groups having 1 to 4 carbon atoms, hydroxyalkyl groups,

amidealkyl groups, cyanoalkyl groups, alkoxyalkyl groups, or carboalkoxyalkyl groups, Y represents an oxygen atom or the NH group of an amide bond, X₅ represents an anion, e.g. chlorine, bromine, iodine, sulfuric acid, sulfonic acid, alkyl sulfate of a C₁₋₄ carbon atom content, phosphoric acid, nitric acid, and the like, u is an integer of 1 to 10, s and t are integers satisfying s + t = 20 to 8,000.

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

The content of the cationic nitrogen originating from cationic polymers in the above vinyl polymers is 0.004 to 0.2%, and preferably 0.01 to 0.15% of the vinyl polymers. 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 following formula are preferable as a polyglycol-polyamine condensate.



wherein R₃₁, R₃₃, R₃₄, and R₃₆ are individually a hydroxyalkylene group having 2-4 carbon atoms, R₃₂ and R₃₅ are individually an alkylene group having 2-3 carbon atoms, a and d are integers of 10-20, c is an integer of 2-4, b is

an integer of 2-6, e is an integer of 1-50, and R₃₇ is a linear or branched alkyl group having 6-12 carbon atoms.

A copolymer of adipic acid and dimethylaminohydroxy-ethylenetriamine (Cartarethine: trade name manufactured by Sandoth Co. of U.S.A.) can also be used.

Cationic polymers mentioned above may be used either singly or as a mixture of two or more of them, and incorporated in the detergent composition of the present invention in an amount of 0.01-5% by weight, preferably 0.05-2% by weight.

The detergent compositions of the present invention can be produced according to a conventional method and can be used as shampoos, light-duty detergents for fine fabrics, and the like. The detergent compositions of the present invention are particularly suitable for use as a shampoo.

The detergent compositions of the present invention impart low irritation to the skin and the eye and have excellent detergency. Insufficiency in amidoamine amphoteric surfactants and sulfosuccinate surfactants, e.g. a poor lathering capability, deficient tactile feeling, and insufficient conditioning effect, are greatly improved in the composition of the present invention. They can be used as detergent compositions requiring low irritation to the skin and membrana mucosa, such as a light-duty detergent for fine fabrics, e.g. wool, a shampoo composition for infants, a hair shampoo for frequent or every-day use, and a shampoo

for the delicate, sensitive skin. The detergent compositions of the present invention can also be used as a shampoo for the hair which becomes difficult to comb due to perming treatments, a shampoo for unruly hair which is hard to set, or the like.

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

Hair-setting easiness, easiness of finger passage through the hair, lathering capability, and irritation to the skin are evaluated according to the following methods.

Hair-setting easiness and easiness of finger passage through the hair

1 gm of a shampoo composition was applied onto healthy Japanese woman's hair weighing 20 gm and 15 cm long. After the shampoo was lathered for one minute, the hair was rinsed with flowing water for 30 seconds, then dried with a towel, and further dried with a drier. The dried hair was organoleptically evaluated according to the following standard.

<Evaluation Standard>

Hair-setting easiness

AAA: easy

BBB: slightly easy

CCC: hard

Easiness of finger passage through the hair

AAA: smooth

BBB: slightly smooth

CCC: passage of finger is hard

<Lathering capability>

0.5% by weight of lanolin was added to a 1% aqueous detergent composition. The mixture was stirred at 40°C for five minutes in a cylinder with a rotator (1,000 rpm). Thirty (30) seconds after the stirring was completed, the state of the lather was evaluated according to the following standard.

<Evaluation Standard>

AAA: abundant lather was produced

BBB: lathering was pretty good

CCC: lathering was insufficient

DDD: little lather was produced

Irritation to the skin

The irritation to skin of detergent compositions was evaluated on the skin of a guinea pig after the skin was washed seven times with a 25% aqueous solution of the detergent.

<Evaluation Standard>

AAA: not irritant or slightly irritant

(Among 20 guinea pigs, erythema was observed on the skin of two or less of them)

BBB: weakly irritant

(Among 20 guinea pigs, erythema was observed on the skin of three or more but not more than ten of them)

CCC: moderately and acutely irritant

(Among 20 guinea pigs, erythema was observed on the skin of 11 or more of them)

Example 1

The shampoo compositions having the formulation shown in Table 1 below were prepared. Lathering capability, hair-setting easiness, and easiness of finger passage through the hair of the compositions were evaluated. The results are shown in Table 1.

Table 1

% by weight

	Comparative Composition			Invention Composition							
	1	2	3	1	2	3	4	5	6	7	8
Sodium N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylenediamine	20	-	10	10	10	10	-	16	12	8	4
Sodium N-lauroyl-N-(2hydroxyethyl)-N',N'-bis(carboxyethyl)ethylenediamine	-	-	-	-	-	-	10	-	-	-	-
Disodium laurylsulfosuccinate	-	-	-	10	-	-	-	-	-	-	-
Disodium polyoxyethylene(4 EO) laurylsulfosuccinate	-	20	10	-	10	-	10	4	8	12	16
Disodium polyoxyethylene(5 EO) lauroylethanolamide sulfosuccinate	-	-	-	-	-	10	-	-	-	-	-
Dimethylpolysiloxane (100,000 cs)	1	1	-	1	1	1	1	1	1	1	1
Lauric acid diethanolamide	3	3	3	3	3	3	3	3	3	3	3
Water	—Balance—			—Balance—							
Evaluation											
Lathering capability	CCC	DDD	AAA	AAA	AAA	BBB	AAA	AAA	AAA	AAA	BBB
Hair-setting easiness	AAA	AAA	CCC	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
Finger passage	AAA	AAA	CCC	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA

Example 2

The shampoo compositions having the formulation shown in Table 2 below were prepared. The irritation to the skin of the compositions were evaluated. The results are shown in Table 2.

Table 2

	% by weight			
	Comparative Composition		Invention Composition	
	4	5	9	10
Triethanolamine N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl) ethylenediamine	-	-	10	-
Triethanolamine N-lauroyl-N-(2-hydroxyethyl)-N',N'-bis (carboxyethyl)ethylenediamine	-	-	-	10
Disodium polyoxyethylene(5 EO) laurylsulfosuccinate	-	-	10	10
Triethanolamine polyoxyethylene (2.5 EO) laurylsulfate	20	-	-	-
Ammonium laurylsulfate	-	20	-	-
Dimethylpolysiloxane (1,000,000 cs)	1	1	1	1
Water	—Balance—		—Balance—	
Evaluation				
Irritation to the skin	BBB	CCC	AAA	AAA

Example 3

The shampoo compositions having the formulation shown in Table 3 below were prepared. Lathering capability, hair-setting easiness, and easiness of finger passage through the hair of the compositions were evaluated. The results are shown in Table 3.

Table 3

	% by weight															
	Comparative Composition								Invention Composition							
	6	7	8	9	11	12	13	14	15	16						
Triethanolamine N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylenediamine	10	10	10	10	10	10	10	10	10	10						
Disodium polyoxyethylene(4 EO) laurylsulfosuccinate	10	10	10	10	10	10	10	10	10	10						
Dimethylpolysiloxane (1 cs)	1	-	-	-	-	-	-	-	-	-						
Dimethylpolysiloxane (500 cs)	-	-	-	-	1	-	-	-	-	-						
Dimethylpolysiloxane (5,000 cs)	-	-	-	-	-	1	-	-	-	-						
Dimethylpolysiloxane (7,500,000 cs)	-	-	0.005	15	-	-	1	-	-	0.5	5					
Dimethylpolysiloxane (10,000,000 cs)	-	-	-	-	-	-	-	1	-	-						
Dimethylpolysiloxane (20,000,000 cs)	-	1	-	-	-	-	-	-	-	-						
Water	Balance								Balance							
Evaluation																
Lathering capability	AAA	AAA	AAA	CCC	AAA	AAA	AAA	AAA	AAA	AAA						
Hair-setting easiness	CCC	CCC	CCC	CCC	AAA	AAA	AAA	AAA	AAA	AAA						
Finger passage through the hair	CCC	AAA	CCC	AAA	AAA	AAA	AAA	AAA	AAA	AAA						

Example 4

<Shampoo>

A shampoo composition shown below imparted excellently low irritation to the skin. The characteristics of lather, the detergency, and the sensation upon use of the composition were also excellent.

	Wt%
(1) Triethanoamine N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl) ethylenediamine	8
(2) Disodium polyoxyethylene(3 EO) laurylsulfosuccinate	10
(3) Lauric acid diethanolamide	3
(4) Lauric acid	1
(5) Dimethylpolysiloxane (1,000,000 cs)	2
(6) Cationic polymer *1	0.2
(7) Perfume	slight amount
(8) Water	Balance

*1 Polymer JR400 (manufactured by Union Carbide Corp.)

Example 5

<Anti-dandruff shampoo>

An anti-dandruff shampoo composition shown below imparted excellently low irritation to the skin. The anti-dandruff effect and sensation of the composition were also excellent.

	Wt%
(1) Triethanoamine N-lauroyl-N'-carboxymethyl-N'-(2-hydroxyethyl)ethylenediamine	9
(2) Disodium polyoxyethylene(5 EO) laurylsulfosuccinate	6
(3) Lauric acid diethanolamide	3
(4) Dimethylpolysiloxane (100,000 cs)	1
(5) Piroctone olamine (Octopyrox)	1
(6) Perfume, Pigment	Appropriate amounts
(7) Water	Balance

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 comprising:
 - (A) one or more amidoamine amphoteric surfactants;
 - (B) one or more sulfosuccinate surfactants; and
 - (C) a non-volatile silicone having a viscosity of 5-15,000,000 cSt at 25°C.
 2. A detergent composition as claimed in Claim 1 and substantially as described in the Examples.
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