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13 Claims. (Cl. 252—152)

Any cationic surface active agent may be employed in the present invention, quaternary ammonium chlorides which contain at least one alkyl group having from 12 to 20 carbon atoms being preferred. Among the numerous cationic surface active agents which may be used are distearyl dimethyl ammonium chloride, stearyl dimethyl benzyl ammonium chloride, stearyl trimethyl ammonium chloride, coco dimethyl benzyl ammonium chloride, dicoco dimethyl ammonium chloride, cetyl pyridinium chloride, cetyl trimethyl ammonium bromide, stearyl amine salts that are soluble in water such as stearyl amine acetate and stearyl amine hydrochloride, stearyl dimethyl amine hydrochloride, distearyl amine hydrochloride, alkyl phenoxyethoxyethyl dimethyl ammonium chloride, decyl pyridinium bromide, pyridinium chloride derivative of the acetyl amino ethyl esters of lauric acid, lauryl trimethyl ammonium chloride, decyl amine acetate, lauryl dimethyl ethyl ammonium chloride, the lactic acid and citric acid and other acid salts of stearyl-1-amidoethyl-2-heptadecyl-2-imidazoline, quaternaries of such imidazoline with methyl chloride, benzyl chloride, chloroacetic acid and similar compounds, mixtures of the foregoing, and the like. Particularly preferred are stearyl trimethyl ammonium chloride, the lactic or the citric acid salt of stearyl-1-amidoethyl-2-heptadecyl-2-imidazoline, or mixtures thereof.

$$-\text{CH}_2\text{CHOHCHOHCH}_2-$$

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In addition, any of these groups, including those containing hydroxy groups, may contain a single oxygen ether or keto linkage, as for example $-\text{C}_2\text{H}_4\text{OC}_2\text{H}_4-$,



or $-\text{CH}_2\text{COCHOHCH}_2-$.

In each compound both of the alkali metal atoms represented by the letter M may be identical or may be different; preferably, the alkali metal atom is either sodium or potassium.

The cycloimidine derivatives are well known and may be prepared as described in Mannheimer U.S. Patents 2,528,378, granted October 31, 1950, and 2,773,068, granted December 4, 1956.

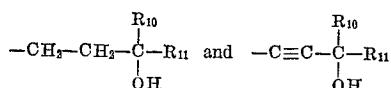
The shampoo compositions of the present invention are aqueous compositions which may contain in addition to water, if desired, small quantities of an alcohol solvent such as ethyl or propyl alcohol. The cationic surface active agent is present in an amount from 0.4% to 7% by weight of the total composition, while the non-ionic polyoxyalkylene surface active agent is present in an amount from 2% to 20% by weight of the total composition, the relative proportions of these two ingredients with respect to each other not being critical. The cycloimidine derivative in order to be effective must be present in an amount from 8% to 20% by weight of the total composition and must be at least equal to the amount of the non-ionic polyoxyalkylene surface active agent present in the composition.

In order to increase the lubricity of the composition still further and to provide a shampoo having high foaming characteristics, it is preferred to include in the composition, in addition to the foregoing ingredients, from 0.4% to 7% by weight of a lower alkylolamide of a fatty acid having from 10 to 20 carbon atoms in the chain; for example, the mono- or di-ethanolamide or mono- or di-isopropanolamide of lauric acid, coconut oil fatty acid, palmitic acid, stearic acid, and the like.

These characteristics may be further improved by including also from 0.4% to 7% by weight of a compound having the structure



in which R_7 and R_8 is each a lower alkyl group containing up to four carbon atoms, and R_9 is one of the radicals having the structure



in which R_{10} and R_{11} is each a lower alkyl group containing up to 4 carbon atoms, among which are 3,6-dimethyl-4-octyne-3,6-diol; 2,5-dimethyl-3-hexyne-2,5-diol; 3,6-diethyl-4-octyne-3,6-diol; 3,6-dimethyloctane-3,6-diol; and the like.

Any of the usual additives such as opacifiers, perfumes, coloring agents, stabilizers, preservatives, and the like may also be included in the composition if desired.

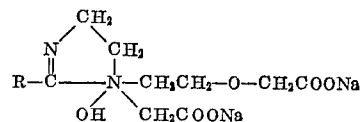
The following specific examples are intended to illustrate more clearly the nature of the invention, but are not intended as a limitation upon the scope of the claims.

Example 1

An aqueous solution was prepared containing 2.4% by weight of the condensation product of ethylene oxide with an alkyl phenol sold under the name Triton X-100 and 1.5% by weight of alkyl dimethyl benzyl ammonium chloride sold under the name BTC. Citric acid was added to adjust the pH of the solution to pH 5, and it was then employed in the standard Draize Rabbit Eye Test procedure. Out of five eyes tested, four showed moderate to severe lesions.

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There was added to the foregoing solution 9.6% by weight of a cycloimidine derivative sold under the name Miranol C2M and having the structure

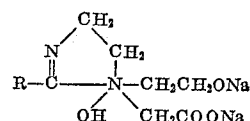


in which R is the residue of coconut oil fatty acid. When employed in the same test only a single negligible reaction was observed out of five eyes tested.

Example 2

An aqueous solution was prepared containing 1.5% by weight of distearyl dimethyl ammonium chloride. When tested as described in Example 1, one moderate to severe lesion was observed in six eyes tested. The addition of Triton X-100 increased considerably the irritancy of the composition until when as much as 12% by weight of Triton X-100 was present (pH 5), four severe lesions and three moderate to severe lesions were observed in seven eyes tested.

However, the irritancy was eliminated by the introduction into the mixture of a cycloimidine derivative known as Miranol CM having the structure



in which R is the residue of coconut fatty acid.

A composition containing 6% by weight of Triton X-100, 1.5% of distearyl dimethyl ammonium chloride, 6% by weight of Miranol CM, and sufficient acid to provide pH 5, when tested as above, showed negative results for all six eyes tested.

Example 3

An aqueous solution was prepared containing 4% by weight of Triton X-100, 15% of distearyl dimethyl ammonium chloride, 16% of Miranol CM, and sufficient lactic acid to provide pH 5. All negative results were obtained out of five eyes tested.

Example 4

An aqueous solution was prepared containing 2.4% by weight of Triton X-100, 1.5% distearyl dimethyl ammonium chloride, 9.6% Miranol C2M, and sufficient tartaric acid to provide neutral pH. All negative results were obtained in six eyes tested.

All of the mixed compositions described in Examples 1 to 4 inclusive possessed the desired cleansing properties of the non-ionic surface active agent as well as the hair-conditioning properties of the cationic surface active agent. Similar results were obtained with other similar materials within the scope of the invention.

Example 5

The following compositions were prepared, in which the parts are by weight, the pH in each case being 5:

	A	B
55 Tergitol NPX (condensation product of 10 to 15 moles of ethylene oxide with nonyl phenol).....	8	6
Stearyl trimethyl ammonium chloride.....	3	3
Miranol C2M.....	16	10
Diethanolamide of lauric acid.....	3	1
3,6-dimethyl-4-octyne-3,6-diol.....	3	3
Citric acid to provide pH 5.....		
70 Water, including perfume, etc., to —	100	100

Each of the foregoing compositions possessed a lubricity even better than that of the compositions of Examples 1 to 4 inclusive and in addition possessed markedly superior foaming characteristics without any loss of cleans-

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ing power or hair-conditioning properties. When tested for ophthalmic irritancy by the standard Draize test, only a single negligible reaction was observed in fifteen eyes tested.

Examples 6 to 11

Aqueous solutions were prepared having the following compositions in which the parts are by weight, the solution in each case being adjusted to pH 5 by addition of citric acid:

Tergitol NPX.....	8.0	8.0	3.0	3.0	8.0	3.0
Diethanolamide of lauric acid.....	3.0	3.0	3.0	3.0	3.0	3.0
Lactic acid salt of stearyl amido ethyl-2-heptadecyl imidazoline.....	5.0	2.5		2.5		
Citric acid salt of stearyl amido ethyl-2-heptadecyl imidazoline.....			5.0			
Stearyl trimethyl ammonium chloride.....		2.5		2.5	3.0	3.0
Ethoxylated lanolin derivative sold as Ethoxylan 50 (50% active).....						4.0
Condensate of ethylene oxide with hydrophobic base formed by condensing propylene oxide with propylene glycol sold as Pluronic F-68.....			8.0	8.0		
Miranol C2M.....	12.0	12.0	12.0	12.0	12.0	12.0
3,6-Dimethyl-4-octyne-3,6-diol.....	3.0	3.0	3.0	3.0	3.0	3.0
Water, perfume, etc., to.....	100	100	100	100	100	100

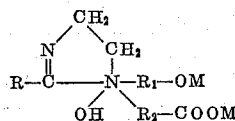
Each of the foregoing compositions possessed a very satisfactory lubricity and exhibited hair conditioning properties along with cleansing properties. All of the compositions were satisfactory when tested for ophthalmic irritancy by the Draize test.

Similar results are obtained using other specific surface active agents as described above.

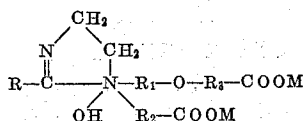
Although specific embodiments of the invention have been described herein, it is not intended to limit the invention solely thereto, but to include all of the obvious variations and modifications within the spirit and scope of the appended claims.

What is claimed is:

1. An aqueous shampoo composition consisting essentially of water in combination with (A) a cationic surface active agent in an amount from 0.4% to 7% by weight, (B) a non-ionic polyoxyalkylene surface active agent containing from 5 to 20 alkyleneoxy units, each said unit having from 2 to 3 carbon atoms, said non-ionic agent being present in an amount from 2% to 20% by weight, and (C) an amount, at least equal to the amount of said non-ionic agent and from 8% to 20% by weight, of a member of the class consisting of compounds having the structures



and



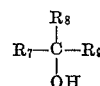
in which R is a hydrocarbon group having from 4 to 18 carbon atoms, R₁, R₂ and R₃ are selected from the group consisting of (a) aliphatic hydrocarbon groups of 1 to 4 carbon atoms, (b) hydroxy-substituted aliphatic hydrocarbon groups of 1 to 4 carbon atoms, (c) aliphatic hydrocarbon groups having a single ether linkage and of 2 to 4 carbon atoms, (d) hydroxy-substituted aliphatic hydrocarbon groups having a single ether linkage and of 2 to 4 carbon atoms, (e) aliphatic keto groups containing only a single keto linkage and otherwise being hydrocarbon of 2 to 4 carbon atoms, (f) aliphatic keto groups containing only a single keto linkage and otherwise being

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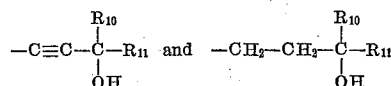
hydroxy-substituted hydrocarbon of 2 to 4 carbon atoms, and M is an alkali metal.

2. An aqueous shampoo composition as defined in claim 1 consisting essentially of in addition from 0.4% to 7% by weight of a lower alkylolamide of a fatty acid having from 10 to 20 carbon atoms.

3. An aqueous shampoo composition as defined in claim 1 consisting essentially of in addition from 0.4% to 7% by weight of a compound having the structure

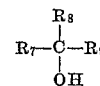


in which R₇ and R₈ is each a lower alkyl group and R₉ is a member of the class consisting of

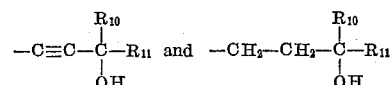


in which R₁₀ and R₁₁ is each a lower alkyl group.

4. An aqueous shampoo composition as defined in claim 1 consisting essentially of in addition from 0.4% to 7% by weight of a lower alkylolamide of a fatty acid having from 10 to 20 carbon atoms, and from 0.4% to 7% by weight of a compound having the structure



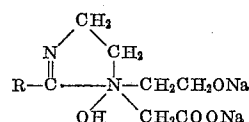
in which R₇ and R₈ is each a lower alkyl group, and R₉ is a member of the class consisting of



in which R₁₀ and R₁₁ is each a lower alkyl group.

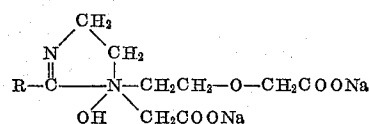
5. An aqueous shampoo composition as defined in claim 1 in which said cationic surface active agent consists essentially of a quaternary ammonium chloride containing at least one alkyl group having 12 to 20 carbon atoms and said non-ionic polyoxyalkylene surface active agent consists essentially of a lower alkyl phenyl polyethylene glycol ether.

6. An aqueous shampoo composition consisting essentially of water in combination with a cationic surface active agent in an amount from 0.4% to 7% by weight, a non-ionic polyoxyalkylene surface active agent containing from 5 to 20 alkyleneoxy units, each said unit having from 2 to 3 carbon atoms, said non-ionic agent being present in an amount from 2% to 20% by weight, and a compound having the structure



in which R is an aliphatic hydrocarbon group having from 4 to 18 carbon atoms, the last said compound being present in an amount from 8% to 20% by weight at least equal to the amount of said non-ionic agent.

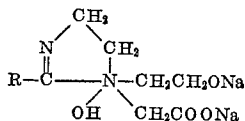
7. An aqueous shampoo composition consisting essentially of water in combination with a cationic surface active agent in an amount from 0.4% to 7% by weight, a non-ionic polyoxyalkylene surface active agent containing from 5 to 20 alkyleneoxy units, each said unit having from 2 to 3 carbon atoms, said non-ionic agent being present in an amount from 2% to 20% by weight, and a compound having the structure



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in which R is an aliphatic hydrocarbon group having from 4 to 18 carbon atoms, the last said compound being present in an amount from 8% to 20% by weight at least equal to the amount of said non-ionic agent.

8. An aqueous shampoo composition consisting essentially of water in combination with a quaternary ammonium chloride containing at least one alkyl group having 12 to 20 carbon atoms as a surface active agent in an amount from 0.4% to 7% by weight, a lower alkyl phenyl polyethylene glycol ether surface active agent containing from 5 to 20 ethylenoxy units, the last-said surface active agent being present in an amount from 2% to 20% by weight, and a compound having the structure

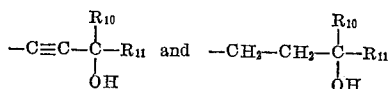


in which R is an aliphatic hydrocarbon group having from 4 to 18 carbon atoms, the last said compound being present in an amount from 8% to 20% by weight at least equal to the amount of said non-ionic agent.

9. An aqueous shampoo composition as defined in claim 8 consisting essentially of in addition from 0.4% to 7% by weight of a compound having the structure

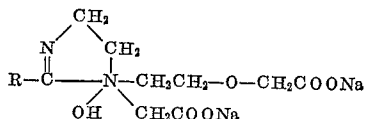


in which R₇ and R₈ is each a lower alkyl group, and R₉ is a member of the class consisting of



in which R₁₀ and R₁₁ is each a lower alkyl group.

10. An aqueous shampoo composition consisting essentially of water in combination with a quaternary ammonium chloride containing at least one alkyl group having 12 to 20 carbon atoms as a surface active agent in an amount from 0.4% to 7% by weight, a lower alkyl phenyl polyethylene glycol ether surface active agent containing from 5 to 20 ethylenoxy units, the last-said surface active agent being present in an amount from 2% to 20% by weight, and a compound having the structure



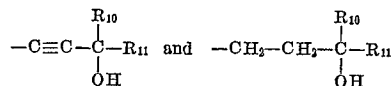
in which R is an aliphatic hydrocarbon group having from 4 to 18 carbon atoms, the last said compound being present in an amount from 8% to 20% by weight at least equal to the amount of said non-ionic agent.

11. An aqueous shampoo composition as defined in claim 10 consisting essentially of in addition from 0.4% to 7% by weight of a compound having the structure



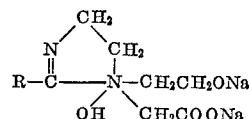
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in which R₇ and R₈ is each a lower alkyl group, and R₉ is a member of the class consisting of



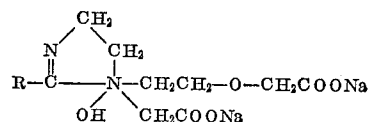
in which R₁₀ and R₁₁ is each a lower alkyl group.

12. An aqueous shampoo composition consisting essentially of water in combination with (A) a member of the class consisting of stearyl trimethyl ammonium chloride, the lactic acid salt of stearyl-1-amidoethyl-2-heptadecyl-2-imidazoline and the citric acid salt of stearyl-1-amidoethyl-2-heptadecyl-2-imidazoline in an amount from 0.4% to 7% by weight, (B) a non-ionic polyoxyethylene surface active agent containing from 5 to 20 ethylenoxy units, said non-ionic agent being present in an amount from 2% to 20% by weight, and a compound having the structure



in which R is an aliphatic hydrocarbon group having from 4 to 18 carbon atoms, the last said compound being present in an amount from 8% to 20% by weight at least equal to the amount of said non-ionic agent.

13. An aqueous shampoo composition consisting essentially of water in combination with (A) a member of the class consisting of stearyl trimethyl ammonium chloride, the lactic acid salt of stearyl-1-amidoethyl-2-heptadecyl-2-imidazoline and the citric acid salt of stearyl-1-amidoethyl-2-heptadecyl-2-imidazoline in an amount from 0.4% to 7% by weight, (B) a non-ionic polyoxyethylene surface active agent containing from 5 to 20 ethylenoxy units, said non-ionic agent being present in an amount from 2% to 20% by weight, and a compound having the structure



in which R is an aliphatic hydrocarbon group having from 4 to 18 carbon atoms, the last said compound being present in an amount from 8% to 20% by weight at least equal to the amount of said non-ionic agent.

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