

1

3,703,481

AQUEOUS-BASED COSMETIC DETERGENT COMPOSITIONS

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11 Claims

ABSTRACT OF THE DISCLOSURE

Improved aqueous detergent compositions for cosmetic applications comprising water, a synthetic organic detergent, and from about 1-20%, by weight, of an ammonium, alkanolamine or alkali metal salt of a monoester of a C₃-C₆ saturated aliphatic dicarboxylic acid with a fatty acid alkanolamide. The compositions exhibit improved properties with regard to emolliency, wetting, lathering and the like.

This invention relates to improved detergent and surfactant compositions. More particularly, this invention relates to improved aqueous-based cosmetic detergent compositions having improved characteristics with regard to emolliency, wetting, lathering, hair manageability, counter-irritancy and the like.

Surfactant compositions, including cosmetic surfactant compositions such as shampoos, shaving creams, skin cleansing compositions and the like, containing various derivatives of polycarboxylic acids are known to the art and are disclosed, for example, in U.S. Pats. No. 2,452,043, issued Oct. 26, 1948 to Lawrence H. Flett; No. 2,490,459, issued Dec. 6, 1949 to Werner Max Lilienfeld; No. 2,562,154, issued July 24, 1951 to Emil A. Vitalis; and 2,878,190, issued Mar. 17, 1959 to Vladimir Dvorkovitz et al. Compounds therein disclosed include, among others, succinic acids, sulfosuccinic acids, sulfosuccinamic acids, esters, sulfosuccinic esters of fatty alkanolamides and salts thereof and various derivatives thereof, and are reported as useful in surfactant compositions, particularly shampoos. However, the aforesaid have numerous deficiencies preventing their use in a wide variety of aqueous-based surfactant compositions as opposed to the fatty alkanolamide monoester salt additives more particularly described herein.

In accordance with the present invention, there have been discovered improved aqueous based cosmetic detergent compositions comprising water, a member of the group of synthetic anionic, nonionic and cationic organic detergents and compatible mixtures of same, and from about 1 to 20%, preferably 3 to 10%, by weight, of a member of the group of ammonium, C₂-C₆ alkanolamine and alkali metal salts of the monoester of a C₃-C₆ saturated, unsubstituted, aliphatic dicarboxylic acid with fatty acid mono- and dialkanol-amides wherein the alkanol portion contains up to 8 carbon atoms.

The compositions of the present invention contain, as an essential ingredient, from about 1 to 20%, by weight, of an aforesaid salt of a monoester of a C₃-C₆ saturated, aliphatic dicarboxylic acid such as succinic, malonic, glutaric or adipic acid with a fatty acid alkanolamide.

The fatty acid alkanolamides are well known to the art and generally comprise those prepared from saturated and unsaturated aliphatic monocarboxylic acids containing from about 8 to 22 carbon atoms and preferably those containing from about 10 to 18 carbon atoms. Exemplary fatty acids are caprylic, capric, lauric, myristic, palmitic, stearic, arachidic, behenic, oleic, linoleic and eleostearic acids and the like, as well as mixed

2

fatty acids such as tall oil fatty acids, hydrogenated tallow fatty acids, coconut oil fatty acids and vegetable fatty acids such as are derived from cottonseed and soybean oil, as well as rosin fatty acids. The alkanolamines which may be condensed with the aforesaid fatty acids comprise both mono- and dialkanolamines containing up to 8 carbon atoms and are exemplified by monoethanolamine, diethanolamine, isopropanolamine, diisopropanolamine, butanolamine, dibutanolamine, diisobutanolamine and the like. These fatty acid alkanolamides may be prepared by various well known techniques such as by condensing equimolar quantities of fatty acid with alkanolamine, or by condensing a molar excess of alkanolamine with fatty acid or by reacting a fatty acid ester with alkanolamine, or by oxyalkylating, such as oxyethylating, the amide of the fatty acid. Particularly preferred fatty alkanolamides are fatty acid monoalkanolamides, particularly monoethanolamides.

The monoesters are prepared, for instance, by reacting appropriate substantially stoichiometric quantities of C₃-C₆ aliphatic saturated dicarboxylic acids with the aforesaid fatty acid alkanolamides in order to prepare fatty acid alkanolamidedicarboxylic acid monoesters having one free -COOH available for salt formation. The fatty acid alkanolamide is preferably esterified with succinic acid. The monoester salts may be the water-soluble ammonium, C₃-C₆ alkanolamine such as ethanolamine, diethanolamine, triethanolamine, isopropanolamine, diisopropanolamine and the like, or alkali metal salts, of the aforesaid monoesters of the fatty acid alkanolamides with dicarboxylic acids. Preferably the monoester salt will be the sodium salt.

The aforesaid salts of fatty acid alkanolamide-dicarboxylic acid monoesters are employable in a wide variety of aqueous-based cosmetic detergent compositions. These cosmetic detergent compositions will generally contain, in addition to the aforesaid salt of a fatty acid alkanolamide-dicarboxylic acid monoester present in amounts varying between 1 and 20%, preferably 3 to 10%, by weight, a quantity of water in the range of about 10 to 90%, by weight, and the balance will be a member of the group of synthetic organic detergents of the anionic, nonionic or cationic type.

The particular synthetic organic detergent, surfactant, soap or mixture thereof chosen for employment in the compositions of the present invention will be dependent upon the particular cosmetic preparation sought to be prepared. The compositions of the present invention encompass shampoos, hair preparations such as conditioners and rinses, shaving preparations, especially aerosol shave preparation, skin conditioners and cleansing compositions, dishwashing detergent compositions, hand lotions, bubble-bath compositions and the like.

The synthetic organic detergents or surface-active agents which may be employed in the compositions of the present invention may be selected from a wide variety of water-soluble anionic, nonionic or cationic surfactants such as are generally employed in aqueous cosmetic detergent or surfactant compositions which are meant to come into contact with the skin or hair.

Exemplary anionic materials are the water-soluble, straight and branched chain alkyl aryl sulfonates, particularly the alkyl benzene sulfonates, wherein the alkyl group contains from about 8 to 15 carbon atoms, the lower alkyl aryl or hydrotropic sulfonates such as sodium xylene sulfonate; the olefin sulfonates such as those produced by sulfonating a C₁₀ to C₂₀ straight chain alpha-olefin; hydroxy C₁₀ to C₂₄ alkyl sulfonates; water-soluble alkene disulfonates containing from about 10 to 24 carbon atoms; the normal and secondary higher alkyl detergents, particularly those having about 8 to 15 carbon

3

atoms in the alcohol residue such as lauryl or coconut fatty alcohol sulfate; sulfuric acid esters of polyhydric alcohols partially esterified with higher fatty acids such as coconut oil monoglyceride monosulfate, coconut ethanolamide sulfate, lauric acid amide or taurine and the like; the various soaps or salts of fatty acids containing from about 8 to 22, particularly 10 to 18, carbon atoms, such as the sodium, potassium, ammonium and lower alkanolamine, particularly mono-, di- and triethanolamine salts of fatty acids such as stearic acid, oleic acid, coconut fatty acid, fatty acids derived from palm oil, soybean oil, tallow and the like. Particularly preferred anionic surfactants include the fatty alcohol and ether alcohol sulfates and the sodium salts of fatty acids containing from about 12 to 18 carbon atoms.

Exemplary nonionic detergents which may be employed in the compositions of the present invention are the polyalkylene oxide condensation products with a hydrophobic organic compound. The hydrophobic organic group usually contains from about 8 to 30 carbon atoms and is condensed with from about 5 to 50 alkylene oxide groups such as ethylene oxide, propylene oxide, butylene oxide, and the like. Specific condensation products include the polyoxyethylene ethers of alkyl phenols wherein the alkyl group contains from about 6 to 12 carbon atoms and containing from about 8 to 18 mols of ethylene oxide per mol of said alkyl phenols; polyalkylene oxide ethers of fatty alcohols such as lauryl, myristyl, cetyl, stearyl and oleyl alcohols, and C_{10} to C_{20} oxo alcohols, which are condensed with from about 10 to 30 mols of ethylene oxide per mol of said alcohols; polyoxyalkylene esters of organic acids such as the higher fatty acids, rosin acids, tall oil acids and the like, said esters containing from about 12 to 30 mols of ethylene oxide and about 8 to 22 carbon atoms in the acyl group; polyalkylene oxides condensates with higher fatty acid amides, such as the higher fatty acid primary amides, mono- and diethanolamides as well as condensates of higher fatty acid sulfonamides.

Further suitable nonionic surfactants are the higher fatty acid alkanolamides, such as the monoethanolamides, diethanolamides and isopropanolamides wherein the acyl radical has an average of from about 10 to 18 carbon atoms. Examples are coconut fatty acid, capric, lauric, oleic and myristic diethanolamides and the corresponding monoethanolamides and isopropanolamides; the fatty tertiary amine oxides which may be represented by the general formula $R_1R_2R_3N \rightarrow O$ wherein R_1 represents C_{10} to C_{18} alkyl such as decyl, dodecyl, tetradecyl, octadecyl and the like and R_2 and R_3 represent methyl or ethyl.

Particularly preferred members of the above group of nonionic surfactants include the fatty acid alkanolamides and the polyoxyalkylene, particularly the ethylene oxide condensates thereof.

Exemplary cationic surfactants which may be employed in the compositions of the present invention are quaternary ammonium salts having long chain hydrophobic radicals such as C_{10} to C_{20} alkyl radicals as exemplified by 1-methyl-1-higher alkyl amido-ethyl-2-higher alkyl imidazolium salts wherein the alkyl groups have 10 to 20 carbon atoms, ethoxylated long chain fatty quaternary ammonium compounds, higher alkyl benzyldimethylammonium salts, higher alkyl isoquinolinium salts, di (higher alkyl) dimethylammonium salts, and the like. The anion of the water-soluble quaternary ammonium compound is most usually a chloride or methosulfate, but other ions may be used such as bromide, phosphate, dialkyl phosphate or acetate ions.

The aforesaid anionic, cationic and nonionic surfactants are generally present in amounts ranging from about 5 to 85%, by weight, depending upon the particular cosmetic formulation prepared. Admixtures of the aforesaid may be employed so long as such admixtures are compatible and do not cause precipitation or otherwise adversely affect the stability of the system.

Exemplary cosmetic detergent compositions are sham-

4

poos containing water, 5-10% fatty amine oxide, 3-5% sodium fatty alcohol sulfate and about 3-5% of said C_3 - C_6 dicarboxylic acid-fatty acid alkanolamide monoester salt; dishwashing liquids containing 15-20% alkyl benzene sulfonate, 5-10% sulfated ethoxylated aliphatic alcohol, 3-10% hydrotropic sulfonate and from 5-10% of said C_3 - C_6 aliphatic dicarboxylic acid-fatty acid alkanolamide monoester salt; shampoo bars containing 60-70% mixed fatty acid soaps and 10-20% of said C_3 - C_6 aliphatic dicarboxylic acid-fatty acid alkanolamide monoester and the like.

Various supplemental materials may be added to the compositions of the present invention such as are generally employed in cosmetic preparations. Exemplary are additives such as lanolin, ethoxylated lanolin, glycerol and polyglycerols, lower alcohols such as ethanols, dyes, perfumes, antibacterial agents such as hexachlorophene, preservative agents such as formalin, sequestering agents such as water-soluble phosphate compounds and the like.

The aqueous-based cosmetic detergent compositions of the present invention possess a number of highly significant advantages. They exhibit excellent emolliency when applied to the skin as hand lotions, skin cleansing compositions, shaving creams, or in the form of dishwashing detergents. Emolliency refers to the desirable after-feel imparted to the skin and the conditioning and protective effects on the skin by the retention of natural greases or oils and the prevention and relief of dryness. Shampoos formulated in accordance with the present invention impart an observable improved manageability and luster to the hair and emolliency to the scalp, and in addition, they have a diminished degreasing effect and are non-irritating to the scalp and skin. Moreover, compositions such as shaving preparations also show excellent wetting and lathering properties and produce a soothing and non-irritating effect upon the skin. Generally the compositions of the present invention have the capacity to reduce and suppress the irritating tendency of conventional detergents commonly employed in detergent compositions. Even in hard water, wetting and lathering properties are not substantially diminished.

The invention is further illustrated by the following examples, which are not to be considered as limitative of its scope. Percentages are by weight.

EXAMPLE I

A shampoo is prepared containing the following ingredients:

	Percent
(a) Sodium lauryl sulfate	7
(b) Lauric diethanolamide	3
(c) Triethanolamine salt of the monoester of succinic acid and coconut monoethanolamide	3
(d) Water	87

The above formulation is found to be high lathering even in hard water, and non-drying to the hair and scalp. It is observed that after use, the hair has good manageability and luster, and does not require the use of a hair conditioning rinse.

EXAMPLE II

A liquid dishwashing detergent is prepared containing the following components:

	Percent
(a) Ammonium dodecyl benzene sulfonate	18
(b) Ammonium sulfate of 4 mol ethylene oxide adduct of nonyl phenol	8
(c) Sodium xylene sulfonate	5
(d) Ethanol	10
(e) Ammonium salt of the monoester of lauric monoethanolamide and succinic acid	5
(f) Water	54

The above formulation is found not only to be non-irritating to the skin but produces an emollient effect on the skin after use. The identical composition, except for the

5

ammonium lauric monoethanolamide monosuccinate is prepared for purposes of comparison and is found to produce a pronounced drying effect on the hands with little or no emollient effect on the skin perceptible.

EXAMPLE III

A soap bar is prepared by combining the following ingredients:

	Percent
(a) Tallow soap	54
(b) Coconut soap	16
(c) Ethoxylated lanolin	2
(d) Sodium salt of the monoester of succinic acid and coconut monoethanolamide	18
(e) Water	10

This soap bar forms a lather with water which is quite copious, similar to that of a shampoo lather and has a desirable after-feel on the skin.

EXAMPLE IV

A shampoo is prepared by combining the following ingredients:

	Percent
(a) Coconut diethanolamide	5.0
(b) Sodium lauryl sulfate	9.0
(c) Triethanolamine dodecyl benzene sulfonate	8.0
(d) Perfume	0.4
(e) Monosodium phosphate	0.6
(f) Sodium salt of the monoester of malonic acid with oleic isopropanolamide	2.0
(g) Water	75

The product when applied to the hair significantly improves manageability with no drying effect on the scalp.

EXAMPLE V

Example IV is repeated, except that for ingredient (f) there is employed the ammonium salt of the monoester of glutaric acid with lauric diethanolamide and equivalent results are obtained.

EXAMPLE VI

A various emollient hand lotion is prepared by combining the following ingredients:

	Percent
(a) Lanolin	2.0
(b) Coconut diethanolamide	20.0
(c) Sodium salt of the monoester of succinic acid with coconut butanolamide	5.0
(d) Hexachlorophene	1.0
(e) Water	72

EXAMPLE VII

A composition suitable as a skin-cleansing liquid or bubble-bath composition is prepared employing the following components:

	Percent
(a) Oleic diethanolamide	3.0
(b) Ammonium coconut monoglyceride	20.0
(c) Sodium lauryl sulfate	5.0
(d) Diethanolamine salt of the monoester of stearic monoethanolamide and adipic acid	10.0
(e) Water	62

EXAMPLE VIII

A shampoo is prepared by combining the following ingredients:

	Percent
(a) Triethanolammonium coconut sulfate	8.0
(b) Sodium alkyl (C ₁₀ -C ₂₀) sulfate	7.0
(c) Sodium t-octylphenyl sulfonate	6.0
(d) Potassium salt of the monoester of succinic acid and lauric monoethanolamide	1.0
(e) Water	78

6

EXAMPLE IX

A hairdressing composition is prepared by combining the following ingredients:

	Percent
(a) Polyoxyethylene ether of lauryl alcohol having 23 oxyethylene units	5.0
(b) Lauric diethanolamide	6.0
(c) Lanolin	2.0
(d) Sodium salt of the monoester of succinic acid and coconut monoethanolamide	5.0
(e) Glycerine	10.0
(f) Water	72

EXAMPLE X

A shaving cream suitable for use in aerosol-type dispensers is prepared by combining the following ingredients:

	Percent
(a) Glycerol	10.0
(b) Triethanolamine	4.0
(c) Stearic acid	4.5
(d) Coconut fatty acids	1.5
(e) Glyceryl monostearate	5.0
(f) Triethanolamine salt of coconut monoethanolamide succinic acid monoester	3.0
(g) Water	66.0
(h) Propellant (dichlorodifluoromethane-dichlorodifluoroethane mixture)	6.0

EXAMPLE XI

An emollient skin cream is prepared by combining the following ingredients:

	Percent
(a) Glyceryl monostearate	10.0
(b) Glycerol	15.0
(c) Cetyl trimethyl ammonium chloride	0.2
(d) Sodium salt of the monoester of succinic acid and coconut monoethanolamide	5.0
(e) Water	69.8

EXAMPLE XII

A shampoo is prepared by combining the following ingredients and is observed by the user to impart a greater degree of manageability and luster to the hair.

	Percent
(a) Polyoxyethylene sorbitan monolaurate	3
(b) Cetyl benzyl dimethyl ammonium bromide	12
(c) Perfume	0.4
(d) Triethanolamine salt of the monoester of succinic acid and lauric monoisopropanolamide	8
(e) Water	76.6

What is claimed is:

1. An aqueous-based cosmetic detergent composition which consists essentially of (a) from about 10% to 90%, by weight, of water; (b) from about 1% to 20%, by weight, of a member of the group consisting of ammonium, C₂-C₆ alkanolamine and alkali metal salts of monoesters of C₃-C₆ saturated, unsubstituted, aliphatic dicarboxylic acids with fatty acid mono- and di-alkanolamides wherein the alkanol portion contains up to 8 carbon atoms; and (c) from 5% to 85%, by weight, of a member of the group consisting of synthetic anionic, non-ionic and cationic organic detergents and compatible mixtures of same with the proviso that said (c) ingredient is distinct from said (b) ingredient.

2. A composition according to claim 1 wherein said aliphatic dicarboxylic acid is succinic acid.

3. A composition according to claim 1 wherein said fatty acid alkanolamide is a monoalkanolamide.

4. A composition according to claim 1 wherein said fatty acid contains from 10 to 18 carbon atoms.

5. A composition according to claim 1 wherein said salt is a sodium salt.

7

6. A composition according to claim 1 wherein said salts of said monoesters are present in an amount of from about 3% to about 10% by weight.

7. A composition according to claim 1 wherein said synthetic organic detergent is a fatty alcohol sulfate.

8. A composition according to claim 1 wherein said synthetic organic detergent is a member of the group consisting of fatty acid salts, fatty acid soaps and mixtures thereof.

9. A composition according to claim 1 wherein said synthetic organic detergent is a fatty acid alkanolamide.

10. A composition according to claim 6 wherein said monoester salt is the sodium salt of the monoester of succinic acid and coconut monoethanolamide.

11. A composition according to claim 6 wherein said

8

monoester salt is the triethanolamine salt of the monoester of succinic acid and lauric monoethanolamide.

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