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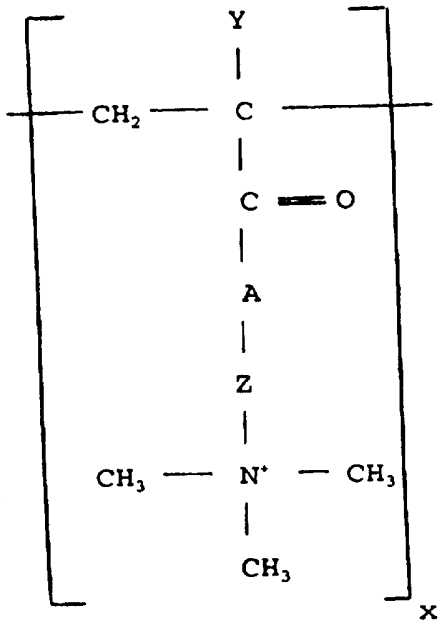
(54) Title: LIQUID CLEANSING COMPOSITIONS COMPRISING SELECT CATIONIC POLYMERS

(57) Abstract

A liquid cleansing composition comprises: (a) 5 % to 50 % by weight of a surfactant system comprising (i) an anionic surfactant or mixture of anionic surfactants; and (ii) a surfactant selected from the group consisting of zwitterionic surfactants, amphoteric surfactants and mixtures thereof; and (b) about 0.01 to 5.0 % by weight of a cationic polymer having structural formula (I), wherein y is hydrogen, or C_1 to C_{10} alkyl; Z = $(CH_2)_n$, wherein n is 0 to 15; A = oxygen or NH; and x is 500 to 100,000 wherein said polymer has a charge density of greater than about 3 milliequivalents per gram. Such a composition provides enhanced feeling of moisturization, mildness and improved lather.



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LIQUID CLEANSING COMPOSITIONS COMPRISING SELECT CATIONIC POLYMERS

FIELD OF THE INVENTION

The present invention relates to liquid personal cleansing compositions (e.g., shower gels or liquids) comprising specific cationic polymers previously unknown for use in such compositions.

BACKGROUND OF THE INVENTION

The use of cationic polymers as skin feel and mildness agents, particularly in synthetic bars, is known. Thus, for example, U.S. Patent No. 5,154,849 to Visscher et al. teaches at column 8, line 60, through column 10, line 60 various polymeric skin feel and mildness aids, including cationic polymers, which can be used in mild skin cleansing toilet bar compositions.

Similarly, U.S. Patent No. 5,096,608 (at columns 7-8); U.S. Patent No. 4,812,253 (columns 7-8); and U.S. Patent No. 4,673,525 (columns 7-8), all to Small et al. teach the use of polymeric skin feel and mildness aids on bars. It is clear that each of the Small et al. references relates to bars since they relate exclusively to problems associated with bar firmness (e.g., U.S. Patent No. 5,096,608 talking about balance between mildness and lathering, bar firmness and/or product stability at column 2, lines 67-69 and column 3, lines 1-3).

The use of compounds structurally equivalent to the compound of the subject invention is also known, although not in liquid personal cleansing compositions. U.S. Patent No. 4,438,095 to Grollier et al., for example, teaches

structurally equivalent compounds at column 8, lines 1-15 (specifically the compound at the far left of column 8). The cationic polymers of Grollier et al., however, are for use in hair or skin conditioning compositions, i.e., compositions free of surfactants.

The use of cationic organic polymers is taught in European Publication No. 056,919 (Assigned to P&G). This reference is not related to any specific cationic agent and, in particular, teaches that polymers have a charge density of about + 3.0 milliequivalents/gram or less.

None of the prior art references teaches the use of the specific cationic polymers of the invention in liquid personal cleansing compositions, let alone compositions having the specific surfactant systems of the subject invention (i.e., anionic/zwitterionic and/or amphoteric surfactant based surfactant systems).

BRIEF DESCRIPTION OF THE INVENTION

Unexpectedly, applicants have now discovered that specifically recited cationic polymers can be used and indeed provide significant benefits when used in liquid personal cleansing compositions generally and, particularly, in compositions having the defined surfactant system of the subject invention.

More specifically, the present invention relates to liquid personal cleansing compositions comprising:

(i) 5% to 50% by wt. of a surfactant system comprising:
  (a) an anionic surfactant or mixture of anionic surfactants; and
  (b) a surfactant selected from the group consisting of zwitterionic surfactants,

amphoteric surfactants and mixtures thereof; and

(ii) about 0.05 to 5.0% by wt. of a cationic polymer of defined structured formula and having a charge density of greater than about 3 meq/gram, preferably ≥ 4 meq/gram, more preferably ≥ 5 meq/gram.

The use of these cationic polymers in the compositions of the invention provides enhanced feeling of moisturization (a consumer desired property); enhanced mildness and improved lather.

DETAILED DESCRIPTION OF INVENTION

The present invention relates to novel liquid personal wash compositions in which specific cationic polymers have been used. The use of those polymers in such compositions is unknown and the polymers have been found unexpectedly to provide entranced moisturization signal, enhanced mildness and improved lather.

Surfactants

The surfactant system of the subject invention comprises 5 to 50% by weight, preferably 10 to 40% by wt. of the composition and comprises:

(a) one or more anionic surfactants;
(b) amphoteric and/or zwitterionic surfactant; and
(c) optional nonionic surfactant

The anionic surfactant may be, for example, an aliphatic sulfonate, such as a primary alkane (e.g., C_8-C_{22}) sulfonate, primary alkane (e.g., C_8-C_{22}) disulfonate, C_8-C_{22} alkene

sulfonate, C_8-C_{22} hydroxyalkane sulfonate or alkyl glyceryl ether sulfonate (AGS); or an aromatic sulfonate such as alkyl benzene sulfonate.

The anionic may also be an alkyl sulfate (e.g., C_{12}-C_{18} alkyl sulfate) or alkyl ether sulfate (including alkyl glyceryl ether sulfates). Among the alkyl ether sulfates are those having the formula:

$$RO(CH_2CH_2O)_nSO_3M$$

wherein R is an alkyl or alkenyl having 8 to 18 carbons, preferably 12 to 18 carbons, n has an average value of greater than 1.0, preferably between 2 and 4; and M is a solubilizing cation such as sodium, potassium, magnesium, ammonium or substituted ammonium. Ammonium and sodium lauryl ether sulfates are preferred.

The anionic may also be alkyl sulfosuccinates (including mono- and dialkyl, e.g., C_6-C_{22} sulfosuccinates); alkyl and acyl taurates, alkyl and acyl sarcosinates, sulfoacetates, C_8-C_{22} alkyl phosphates and phosphates, alkyl phosphate esters and alkoxyl alkyl phosphate esters, acyl lactates, C_8-C_{22} monoalkyl succinates and maleates, sulphoacetates, and acyl isethionates.

Sulfosuccinates may be monoalkyl sulfosuccinates having the formula:

$$R^4O_2CCH_2CH(SO_3M)CO_2M;$$

amido-MEA sulfosuccinates of the formula

$$R^4CONHCH_2CH_2O_2CCH_2CH(SO_3M)CO_2M$$

wherein R^4 ranges from C_8-C_{22} alkyl and M is a solubilizing cation;

amido-MIPA sulfosuccinates of formula

$$RCONH(CH_2)CH(CH_3)(SO_3M)CO_2M$$

where M is as defined above.

Also included are the alkoxylated citrate sulfosuccinates (e.g. Rewopol$^{(R)}$ SBCS50 from Witco); and alkoxylated sulfosuccinates such as the following:

$$R\text{-}O\text{-}(CH_2CH_2O)_nC(=O)CH_2CH(SO_3M)CO_2M$$

wherein n = 1 to 20; and M is as defined above.

Sarcosinates are generally indicated by the formula $RCON(CH_3)CH_2CO_2M$, wherein R ranges from C_8 to C_{20} alkyl and M is a solubilizing cation.

Taurates are generally identified by formula

$R^2CONR^3CH_2CH_2SO_3M$

wherein R^2 ranges from C_8-C_{20} alkyl, R^3 ranges from C_1-C_4 alkyl and M is a solubilizing cation.

Another class of anionics are carboxylates such as follows:

$$R\text{-}(CH_2CH_2O)_nCO_2M$$

wherein R is C_8 to C_{20} alkyl; n is 0 to 20; and M is as defined above.

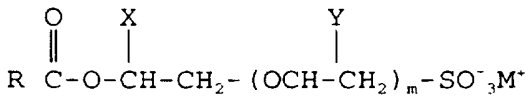
Another carboxylate which can be used is amido alkyl

polypeptide carboxylates such as, for example, Monteine LCQ(R) by Seppic.

Another surfactant which may be used are the C_8-C_{18} acyl isethionates. These esters are prepared by reaction between alkali metal isethionate with mixed aliphatic fatty acids having from 6 to 18 carbon atoms and an iodine value of less than 20. At least 75% of the mixed fatty acids have from 12 to 18 carbon atoms and up to 25% have from 6 to 10 carbon atoms.

Acyl isethionates, when present, will generally range from about 0.5-15% by weight of the total composition. Preferably, this component is present from about 1 to about 10%.

The acyl isethionate may be an alkoxylated isethionate such as is described in Ilardi et al., U.S. Patent No. 5,393,466, hereby incorporated by reference into the subject application. This compound has the general formula:

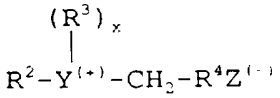


wherein R is an alkyl group having 8 to 18 carbons, m is an integer from 1 to 4, X and Y are hydrogen or an alkyl group having 1 to 4 carbons and M^+ is a monovalent cation such as, for example,sodium, potassium or ammonium.

In general the anionic component will comprise from about 1 to 20% by weight of the composition, preferably 2 to 15%, most preferably 5 to 12% by weight of the composition.

Zwitterionic and Amphoteric Surfactants

Zwitterionic surfactants are exemplified by those which can be broadly described as derivatives of aliphatic quaternary ammonium, phosphonium, and sulfonium compounds, in which the aliphatic radicals can be straight or branched chain, and wherein one of the aliphatic substituents contains from about 8 to about 18 carbon atoms and one contains an anionic group,e.g., carboxy, sulfonate,sulfate, phosphate, or phosphonate. A general formula for these compounds is:



wherein R^2 contains an alkyl, alkenyl, or hydroxy alkyl radical of from about 8 to about 18 carbon atoms, from 0 to about 10 ethylene oxide moieties and from 0 to about 1 glyceryl moiety; Y is selected from the group consisting of nitrogen, phosphorus, and sulfur atoms; R^3 is an alkyl or monohydroxyalkyl group containing about 1 to about 3 carbon atoms; X is 1 when Y is a sulfur atom, and 2 when Y is a nitrogen or phosphorus atom; R^4 is an alkylene or hydroxyalkylene of from about 1 to about 4 carbon atoms and Z is a radical selected from the group consisting of carboxylate, sulfonate, sulfate, phosphonate, and phosphate groups.

Examples of such surfactants include:

4-[N,N-di(2-hydroxyethyl)-N-octadecylammonio]-butane-1-carboxylate;

5-[S-3-hydroxypropyl-S-hexadecylsulfonio]-3-hydroxypentane-1-sulfate;

3-[P,P-diethyl-P-3,6,9-trioxatetradexocylphosphonio]-2-hydroxypropane-1-phosphate;

3-[N,N-dipropyl-N-3-dodecoxy-2-hydroxypropylammonio]-

propane-1-phosphonate;

3-(N,N-dimethyl-N-hexadecylammonio)propane-1-sulfonate;

3-(N,N-dimethyl-N-hexadecylammonio)-2-hydroxypropane-1-sulfonate;

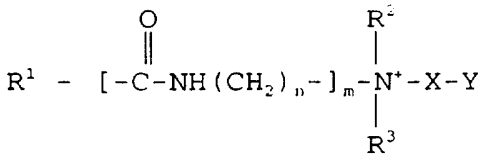
4-[N,N-di(2-hydroxyethyl)-N-(2-hydroxydodecyl)ammonio]-butane-1-carboxylate;

3-[S-ethyl-S-(3-dodecoxy-2-hydroxypropyl)sulfonio]-propane-1-phosphate;

3-[P,P-dimethyl-P-dodecylphosphonio]-propane-1-phosphonate; and

5-[N,N-di(3-hydroxypropyl)-N-hexadecylammonio]-2-hydroxy-pentane-1-sulfate.

Amphoteric detergents which may be used in this invention include at least one acid group. This may be a carboxylic or a sulphonic acid group. They include quaternary nitrogen and therefore are quaternary amido acids. They should generally include an alkyl or alkenyl group of 7 to 18 carbon atoms. They will usually comply with an overall structural formula:



where R^1 is alkyl or alkenyl of 7 to 18 carbon atoms;

R^2 and R^3 are each independently alkyl, hydroxyalkyl or carboxyalkyl of 1 to 3 carbon atoms;

n is 2 to 4;

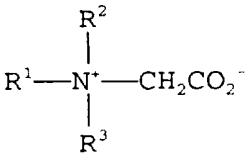
m is 0 to 1;

X is alkylene of 1 to 3 carbon atoms optionally

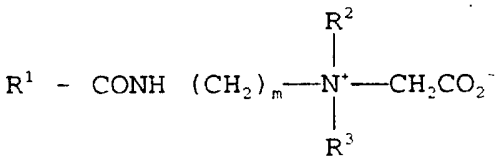
substituted with hydroxyl, and

Y is $-CO_2-$ or $-SO_3-$

Suitable amphoteric detergents within the above general formula include simple betaines of formula:



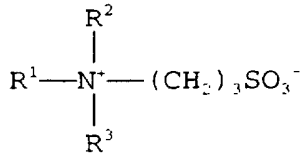
and amido betaines of formula:



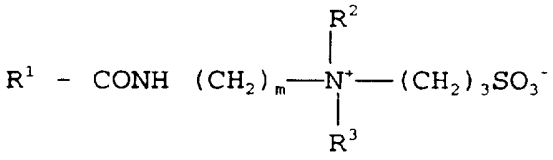
where m is 2 or 3.

In both formulae R^1, R^2 and R^3 are as defined previously. R^1 may in particular be a mixture of C_{12} and C_{14} alkyl groups derived from coconut so that at least half, preferably at least three quarters of the groups R^1 have 10 to 14 carbon atoms. R^2 and R^3 are preferably methyl.

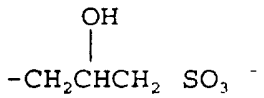
A further possibility is that the amphoteric detergent is a sulphobetaine of formula



or



where m is 2 or 3, or variants of these in which $-(CH_2)_3SO^-_3$ is replaced by



In these formulae R^1, R^2 and R^3 are as discussed previously.

Amphoacetates and diamphoacetates are also intended to be covered in possible zwitterionic and/or amphoteric compounds which may be used.

The amphoteric/zwitterionic generally comprises 0.1 to 20% by weight, preferably 5% to 15% of the composition.

In addition to one or more anionic and amphoteric and/or zwitterionic, the surfactant system may optionally comprise a nonionic surfactant.

The nonionic which may be used includes in particular the reaction products of compounds having a hydrophobic group and a reactive hydrogen atom, for example aliphatic alcohols, acids, amides or alkyl phenols with alkylene oxides, especially ethylene oxide either alone or with propylene oxide. Specific nonionic detergent compounds are alkyl (C_6-C_{22}) phenols-ethylene oxide condensates, the condensation products of aliphatic (C_8-C_{18}) primary or secondary linear or branched alcohols with ethylene oxide, and products made by condensation of ethylene oxide with the reaction products of

propylene oxide and ethylenediamine. Other so-called nonionic detergent compounds include long chain tertiary amine oxides, long chain tertiary phosphine oxides and dialkyl sulphoxides.

The nonionic may also be a sugar amide, such as a polysaccharide amide. Specifically, the surfactant may be one of the lactobionamides described in U.S. Patent No. 5,389,279 to Au et al. which is hereby incorporated by reference or it may be one of the sugar amides described in Patent No. 5,009,814 to Kelkenberg, hereby incorporated into the subject application by reference.

Other surfactants which may be used are described in U.S. Patent No. 3,723,325 to Parran Jr. and alkyl polysaccharide nonionic surfactants as disclosed in U.S. Patent No. 4,565,647 to Llenado, both of which are also incorporated into the subject application by reference.

Preferred alkyl polysaccharides are alkylpolyglycosides of the formula

$$R^2O(C_nH_{2n}O)_t(\text{glycosyl})_x$$

wherein R^2 is selected from the group consisting of alkyl, alkylphenyl, hydroxyalkyl, hydroxyalkylphenyl, and mixtures thereof in which alkyl groups contain from about 10 to about 18, preferably from about 12 to about 14, carbon atoms; n is 0 to 3, preferably 2; t is from 0 to about 10, preferably 0; and x is from 1.3 to about 10, preferably from 1.3 to about 2.7. The glycosyl is preferably derived from glucose. To prepare these compounds, the alcohol or alkylpolyethoxy alcohol is formed first and then reacted with glucose, or a source of glucose, to form the glucoside (attachment at the 1-position). The additional glycosyl

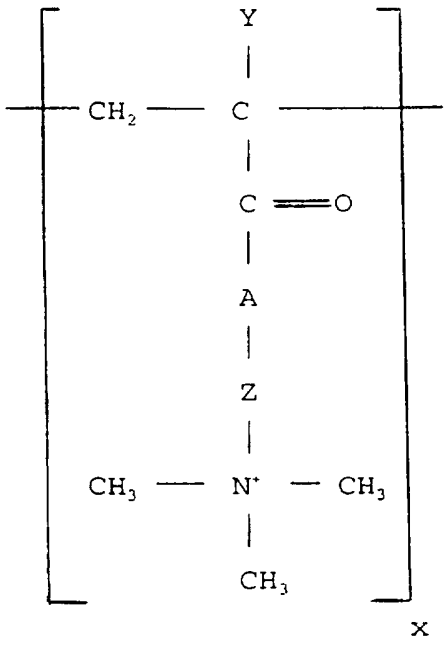
units can then be attached between their 1-position and the preceding glycosyl units 2-, 3-, 4- and/or 6-position, preferably predominantly the 2-position.

Nonionic comprises 0 to 10% by wt. of the composition.

In general, the compositions of the invention comprise less than 2%, more preferably less than 1% by wt. soap and most preferably they are soap-free.

Cationic Polymer

The liquid personal wash compositions of the invention are characterized by the use of a cationic polymer having the structural formulas as follows:

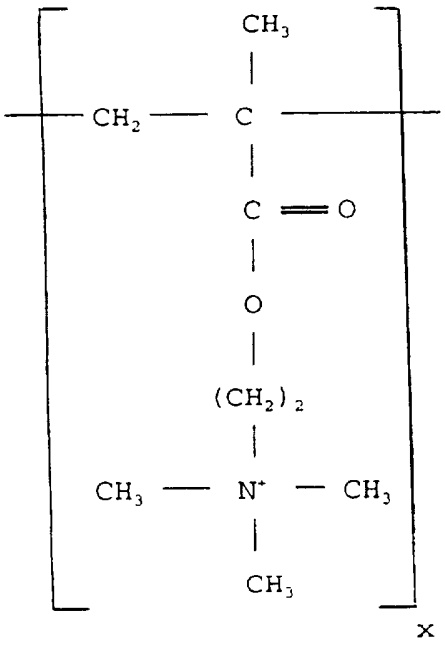


wherein y is hydrogen or C_1 to C_{10} alkyl group (e.g., methyl, ethyl, propyl);

z = $(CH_2)_n$, n is 0 to 15;
A = Oxygen or NH; and
x is 500 to 100,000

Examples of this include Salcare SC96(R) from Allied Colloids or Polycare 133(R)
from Rhone Poulenc.

More specifically, the polymer has the following formula:



wherein x is 500 to 100,000, preferably 1,000 to 80,000.

An example of this includes Salcare SC96(R) from Allied Colloids.

The cationic polymer has a charge density of greater than about 3 milliequivalents per gram, preferably ≥ 4 meq/gram, and preferably ≥ 5 meq/gram. The polymer also has

molecular weight of 100,000 and greater, preferably 100,000 to 5,000,000.

The cationic polymer is used in an amount of from about 0.05 to 5.0 by wt. of the composition, preferably 0.05 to 2.0%.

Other Ingredients

In addition to the surfactants and cationic polymer, the compositions of the invention may comprise any one of a number of other ingredients commercially found in liquid personal cleansing compositions.

The compositions may comprise, for example, an oil/emollient (separate from moisturizing effect provided by cationic). Examples are set forth below:

Vegetable oils: Arachis oil, castor oil, cocoa butter, coconut oil, corn oil, cotton seed oil, olive oil, palm kernel oil, rapeseed oil, safflower seed oil, sesame seed oil, soybean oil, and sunflower seed oil.

Esters: Butyl myristate, cetyl palmitate, decyl oleate, glyceryl laurate, glyceryl ricinoleate, glyceryl stearate, glyceryl isostearate, hexyl laurate, isobutyl palmitate, isocetyl stearate, isopropyl isostearate, isopropyl laurate, isopropyl linoleate, isopropyl myristate, isopropyl palmitate, isopropyl stearate, propylene glycol monolaurate, propylene glycol ricinoleate, PTIS (pentaerythrityl tetraisostearate), propylene glycol stearate, and propylene glycol isostearate.

Animal Fats: Acytylated lanolin alcohols, lanolin, lard, mink oil and tallow.

Fatty acids and alcohols: Behenic acid, palmitic acid, stearic acid, lauric acid, behenyl alcohol, cetyl alcohol, eicosanyl alcohol and isocetyl alcohol.

Other examples of oil/emollients include mineral oil, petrolatum, silicone oil such as dimethyl polysiloxane, lauryl and myristyl lactate.

The emollient/oil is generally used in an amount from about 1 to 30%, preferably 3 to 25% by wt. of the composition.

The composition may further comprise 0.0 to 15%, preferably 1 to 10% by wt. of a structuring agent which help form a suspending lamellar phase while maintaining good consumer rheology. The structurant is generally an unsaturated and/or branched long chain (C_8-C_{24}) liquid fatty acid or ester derivative thereof; and/or unsaturated and/or branched long chain liquid alcohol or ether derivatives thereof. It may also be a short chain saturated fatty acid such as capric acid or caprylic acid. While not wishing to be bound by theory, it is believed that the unsaturated part of the fatty acid of alcohol or the branched part of the fatty acid or alcohol acts to "disorder" the surfactant hydrophobic chains and induce formation of lamellar phase.

Examples of liquid fatty acids which may be used are oleic acid, isostearic acid, linoleic acid, linolenic acid, ricinoleic acid, elaidic acid, arichidonic acid, myristoleic acid and palmitoleic acid. Ester derivatives include propylene glycol isostearate, propylene glycol oleate, glyceryl isostearate, glyceryl oleate and polyglyceryl diisostearate.

Examples of alcohols include oleyl alcohol, lauryl alcohol and isostearyl alcohol. Examples of ether derivatives include isosteareth or oleth carboxylic acid; or isosteareth or oleth alcohol.

The structuring agent may be defined as having melting point below about 25°C centigrade.

Other structurants such as carbomer (e.g., cross-linked polyacrylates) and clays may also be used although compositions formed are less shear thinning.

In addition, the compositions of the invention may include optional ingredients as follows:

Organic solvents, such as ethanol; auxiliary thickeners, such as carboxymethylcellulose, magnesium aluminum silicate, hydroxyethylcellulose, methylcellulose, carbopols, glucamides, or Antil(R) from Goldschmidt; perfumes; sequestering agents, such as tetrasodium ethylenediaminetetraacetate (EDTA), EHDP or mixtures in an amount of 0.01 to 1%, preferably 0.01 to 0.05%; and coloring agents, opacifiers and pearlizers such as zinc stearate, magnesium stearate, TiO_2, EGMS (ethylene glycol monostearate) or Lytron 621 (Styrene/Acrylate copolymer); all of which are useful in enhancing the appearance or cosmetic properties of the product.

The compositions may further comprise antimicrobials such as 2-hydroxy-4,2'4' trichlorodiphenylether (DP300); preservatives such as dimethyloldimethylhydantoin (Glydant XL1000), parabens, sorbic acid etc.

The compositions may also comprise coconut acyl mono- or diethanol amides as lather boosters, and strongly ionizing

salts such as sodium chloride and sodium sulfate may also be used to advantage.

Antioxidants such as, for example, butylated hydroxytoluene (BHT) may be used advantageously in amounts of about 0.01% or higher if appropriate.

Additional cationic conditioners which may be used include Quatrisoft LM-200 Polyquaternium-24, Merquat Plus 3330 - Polyquaternium 39; and Jaguar(R) type conditioners.

Polyethylene glycols which may be used include:

Polyox	WSR-205	PEG 14M,
Polyox	WSR-N-60K	PEG 45M, or
Polyox	WSR-N-750	PEG 7M.

Thickeners which may be used include Amerchol Polymer HM 1500 (Nonoxynyl Hydroethyl Cellulose); Glucam DOE 120 (PEG 120 Methyl Glucose Dioleate); Rewoderm(R) (PEG modified glyceryl cocoate, palmate or tallowate) from Rewo Chemicals; Antil(R) 141 (from Goldschmidt).

Another optional ingredient which may be added are the deflocculating polymers such as are taught in U.S. Patent No. 5,147,576 to Montague, hereby incorporated by reference.

Another ingredient which may be included are exfoliants such as polyoxyethylene beads, walnut sheets and apricot seeds

The composition of the invention comprise at least 40% water and preferably at least 50% water.

The invention will now be described in greater detail by way of the following non-limiting examples. The examples are for illustrative purposes only and not intended to be limiting in any way.

All percentages in the specification and examples are intended to be by weight unless stated otherwise.

EXAMPLES

Methodology

Zein Testing

The mildness of products can be measured using zein solubilization test. Zein is a corn protein with limited solubility in water. The enhancement of its solubility by anionic surfactants has been correlated with harshness of surfactants towards skin. A harsh surfactant such as SDS (sodium dodecyl sulfate) causes large dissolution of zein while a mild product causes a smaller amount of zein to be dissolved. In this test, 7.5 g. of the shower gel and 22.5 g of water are mixed thoroughly. To this is added 1.5 g. of zein, and mixed for 1 hour. The mixture is then centrifuged for 30 minutes at 3,000 rpm. After centrifugation, the pellet is extracted, washed with water, and dried in a vacuum oven for 24 hours. The weight of the dried sample is measured and subtracted from 1.5 to yield the amount of zein that is dissolved by the surfactants. The % zein dissolved by the product is an indication of its harshness.

The cationic polymers of the invention can be used in any one of the following compositions I to V.

EXAMPLES

Ingredients	I	II	III	IV	V
Cocoamido Propyl Betaine	10	8	8	10	10
Sodium Cocoyl Isethionate	5	7.5	7.5	5	7.5
Sodium Laureth Sulfate	5	4.5	4.5	5	7.5
Polyquaternium 37	0.5	0.2	0.3	0	0
Polymethacryl amidopropyl trimonium Chloride	0	0	0	0.5	0.5
Dimethicone	0	0	5	5	5
Castor Oil	5	5	0	0	0
Propylene Glycol	0.5	0.5	0.5	0.5	0.5
Oleic acid	6.0	5.0	4.5	0	0
Isostearic acid	0	0	0	5.0	5.0
PEG-55 Propylene Glycol Oleate	0.5	0.5	0.5	0.25	0.25
Guar Hydroxypropyl-trimonium Chloride	0.25	0.25	0.25	0.1	0.1
Titanium Dioxide	0.2	0.2	0.2	0.2	0.2
EDTA	0.02	0.02	0.02	0.02	0.02
EHDP	0.02	0.02	0.02	0.02	0.02
DMDM Hydantoin	0.2	0.2	0.2	0.02	0.02
Fragrance	1.0	1.0	0.8	1.0	1.0
BHT	0.0075	0.0075	0.0075	0.0075	0.0075
Water	to 100.0	to 100.0	to 100.0	to 100.0	to 100.0

Example 5

Various polymers were tested in Formulation VI (no polymer) to X (polymers (1) - (4) below, to determine % zein

solubilized. Full formulations VI - X are as follows:

Ingredients	VI	VII	VIII	IX	X
Cocoamido Propyl Betaine	10	10	10	10	10
Sodium Cocoyl Isethionate	5	5	5	5	5
Sodium Laureth Sulfate	5	5	5	5	5
Polycare 133 (Polymethacryl amidopropyl trimonium Chloride)	0	1.0	0	0	0
Salcare SC-96 (Polyquaternium 37)	0	0	1.0	0	0
Mirapol A15 (Polyquaternium 2)	0	0	0	1.0	0
Merquat Plus 3330 (Polyquaternium 39)	0	0	0	0	1.0
Castor Oil	5	5	5	5	5
Glycerine	0.5	0.5	0.5	0.5	0.5
Oleic acid	4.75	4.75	4.75	4.75	4.75
PEG-120 Methyl Glucose Dioleate	0.5	0.5	0.5	0.5	0.5
Guar Hydroxypropyl-trimonium Chloride	0.25	0.25	0.25	0.25	0.25
Titanium Dioxide	0.2	0.2	0.2	0.2	0.2
EDTA	0.02	0.02	0.02	0.02	0.02
EHDP	0.02	0.02	0.02	0.02	0.02
DMDM Hydantoin	0.2	0.2	0.2	0.2	0.2
Fragrance	1.0	1.0	1.0	1.0	1.0
BHT	0.0075	0.0075	0.0075	0.0075	0.0075
Water	to 100.0	to 100.0	to 100.0	to 100.0	to 100.0

Results of the polymers tested are as set forth below:

	Polymer	% Zein Solubilized
	No Polymer	38.3
(1)	Polycare 133(R) from Rhone Poulenc*	6.7
(2)	Salcare SC96(R) from Allied Colloids**	18.6
(3)	Mirapol A15(R) from Rhone Poulenc***	27.9
(4)	Merquat 3330(R) from Calgon****	37.8

* Polymethacryl amido propyl trimonium chloride

** Polyquaternium 37

*** Polyquaternium 2

**** Polyquaternium 39

This test shows that, when cationic polymer of the invention were used (Polymers (1) and (2), zein solubilization (more zein dissolved equals increased harshness) was significantly reduced.

CLAIMS

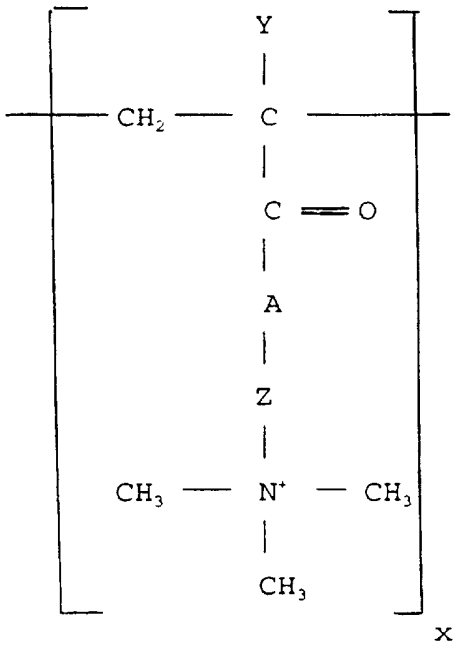
1. A liquid cleansing composition comprising

(a) 5% to 50% by wt. of a surfactant system comprising

(i) an anionic surfactant or mixture of anionic surfactants; and

(ii) a surfactant selected from the group consisting of zwitterionic surfactants, amphoteric surfactants and mixtures thereof; and

(b) about 0.01 to 5.0% by wt. of a cationic polymer having the structural formula as follows:



wherein y is Hydrogen or C_1 to C_{10} alkyl;

z = $(CH_2)_n$, wherein n is 0 to 15;

A = Oxygen or NH; and

x is 500 to 100,000

wherein said polymer has a charge density of

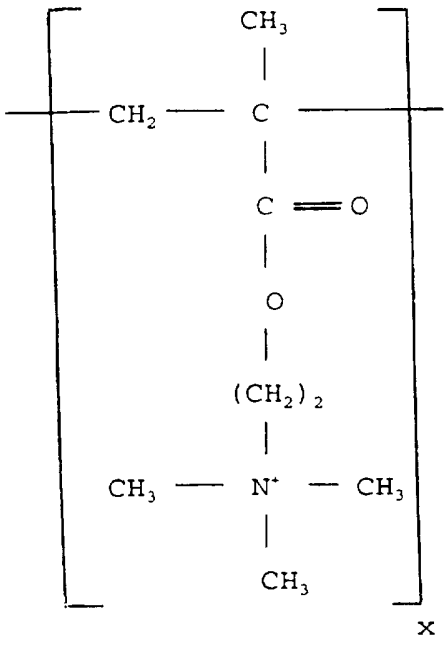
greater than about 3 milliequivalents per gram.

2. A composition as claimed in claim 1, comprising 0.05 to 2.0% polymer.

3. A composition as claimed in either claim 1 or claim 2, wherein said polymer has charge density ≥ 4 milliequivalents/gram, optionally wherein said polymer has charge density ≥ 5 to 20 milliequivalents/gram.

4. A composition as claimed in any preceding claim, wherein said polymer has MW ≥ 100,000, optionally MW of 100,000 to 5,000,000.

5. A composition as claimed in any preceding claim, wherein said polymer has the following formula:



wherein x is 500 to 100,000.

INTERNATIONAL SEARCH REPORT

Interna al Application No
PCT/EP 97/00453

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61K7/50 A61K7/075

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 95 22311 A (UNILEVER) 24 August 1995 see page 2, line 19 - page 3, line 2; claims 1-3; example 2	1-5
X	FR 2 718 961 A (L'OREAL) 27 October 1995 see page 13, line 15 - line 31; claims 1,6,10-13; examples 4,5	1-5
X	WO 94 21224 A (L'OREAL) 29 September 1994 see page 6, line 20 - page 7, line 8; claims 1,4-17; examples 6,7	1-5

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

1

Date of the actual completion of the international search	Date of mailing of the international search report
9 June 1997	27. 06. 97
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax (+ 31-70) 340-3016	Authorized officer Willekens, G

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INTERNATIONAL SEARCH REPORT

...formation on patent family members

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PCT/EP 97/00453

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