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(54) **Creamy scouring compositions.**

(57) Stable, viscous creamy scouring compositions are disclosed, which are substantially free of terpene solvents, and contain a narrowly-defined solvent derived from propylene glycol.

The compositions of the invention show excellent cleaning ease-of-rinsing, shine performance, and are not aggressive to cleansed surfaces and packaging materials.

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CREAMY SCOURING COMPOSITIONS

Technical Field

The present invention relates to stable, viscous abrasive-containing scouring compositions, which show excellent cleaning, ease-of-rinsing, and shine performance, and are not aggressive to surfaces to be cleansed therewith and packaging materials.

These compositions are substantially free of terpene solvents, and contain a narrowly-defined solvent derived from propylene glycol.

Background

It is well-known to formulate scouring compositions, in liquid or creamy form, containing solvents.

In particular, creamy scouring compositions containing an abrasive and binary solvent system constituted of terpenes and polar solvents have been disclosed in European Patent Application 0,126,545, published on November 28, 1984. In these compositions, the terpenes show both cleaning and desirable emulsification properties, which enhance product viscosity.

It has become desirable, however, to replace terpenes by solvents which are fully compatible with all types of surfaces to be cleansed therewith, and packaging materials, and at the same time exhibit good cleaning and emulsification properties.

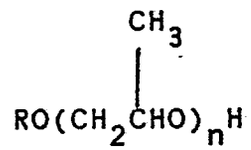
It now been found that viscous terpene solvent free creamy scouring cleanser compositions showing remarkable cleaning efficiency, ease-of-rinsing and surface-compatibility, can be formulated which contain a narrowly-defined solvent derived from propylene glycol.

US-3,591,510 discloses the use of solvents of this type in liquid hard surface cleaning compositions free of abrasive. EP-A-O 040 882 mentions the use of propylene glycol-derived solvents, in combination with terpenes and benzyl alcohols, in liquid hard surface cleanser free of abrasive.

It is an object of the present invention to provide viscous creamy cleanser compositions which are fully compatible with surfaces to be cleansed therewith and packaging materials. It is a further object of the present invention to provide a cleanser composition with excellent cleaning, ease-off-reasing and shine performance.

Summary of the Invention

The present invention relates to a viscous creamy scouring cleanser being substantially free of terpene solvents, containing a surface-active agent, an abrasive, and an organic solvent and if desired conventional additives, characterized in that said cleanser is substantially free of terpene solvents and that the organic solvent is represented by the formula:



wherein R is a C_1 to C_8 alkyl, alkenyl or alkyl aryl group, preferably a C_1 to C_4 alkyl group, and n is an integer from 1 to 4, preferably 1 or 2.

Detailed Description of the Invention

The surface-active agents, the abrasives, the solvent and the optional ingredients are described in more detail hereinafter.

Unless indicated to the contrary, the %-indications stand for "% by weight".

Surface-active Agents

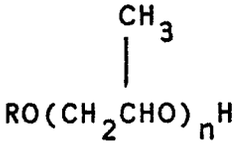
Water-soluble detersive surfactants useful herein include well-known synthetic anionic, nonionic, amphoteric and zwitterionic surfactants and mixtures thereof. Typical of these are the alkyl benzene sulfates and sulfonates, paraffin sulfonates, olefin sulfonates, alkoxylated (especially ethoxylated) alcohols and alkyl phenols, amine oxides, sulfonates of fatty acids and of fatty acid esters, and the like, which are well-known in the detergency art. In general, such detersive surfactants contain an alkyl group in the C_{10}-C_{18} range; the anionic detersive surfactants are most commonly used in the form of their sodium, potassium or triethanolammonium salts. The nonionics generally contain from 3 to 17 ethylene oxide groups per mole of hydrophobic moeity. Especially preferred in the compositions of the present invention are: C_{12}-C_{16} alkyl benzene sulfonates, C_{12}-C_{18} paraffin-sulfonates and the ethoxylated alcohols of the formula $RO(CH_2CH_2O)_n$, with R being a C_{12}-C_{15} alkyl chain and n being a number from 6 to 10.

Anionic sufactants are frequently present at levels from 0.3 to 8%, preferably 2 to 4%, of the composition. Nonionic surfactants, are used at levels between 0.1% to 6% by weight of the composition. Mixtures of the like surfactants can also be used. The total level of surface-active agent is preferably from 3% to 5%.

Abrasive -The abrasive types employed herein are selected from water-insoluble, non-gritty materials well-known in the literature for their relatively mild abrasive properties. It is highly preferred that the abrasives used herein not be undesirably "scratchy". Abrasive materials having a Mohs hardness in the range of about 7, or below, are typically used; abrasives having a Mohs hardness of 3, or below, can be used to avoid scratches on aluminum or stainless steel finishes. Suitable abrasives herein include inorganic materials, especially such materials as calcium carbonate and diatomaceous earth, as well as materials such as Fuller's earth, magnesium carbonate, China clay, attapulgite, calcium hydroxyapatite, calcium orthophosphate, dolomite and the like. The aforesaid inorganic materials can be qualified as "strong abrasives". Synthetic organic abrasives such as urea-formaldehyde, methyl methacrylate melamine-formaldehyde resins, polyethylene spheres and polyvinylchloride can be advantageously used in order to avoid scratching on certain surfaces, especially plastic surfaces. When such "soft abrasives" are used, strong builders can be incorporated in the composition.

Typically, abrasives have a particle size range of 10-1000 microns and are used at concentrations of 5% to 30% in the compositions. Thickeners are frequently added to suspend the abrasives.

The organic solvent -The organic solvent to be used in the present composition has the general formula



wherein R is an alkyl, alkenyl, or alkyl-aryl group having from 1 to 8 carbon atoms, and n is an integer from 1 to 4. Preferably, R is a alkyl group containing 1 to 4 carbon atoms, and n is 1 or 2. Especially preferred R groups are n-butyl or isobutyl. Most preferred species are 1-n-butoxypropane-2-ol (n = 1); and 1(2-n-butoxy-1methylethoxy)propane-2-ol (n = 2), and mixtures thereof. 1-n-butoxypropane-2-ol is especially preferred.

The organic solvent herein is used at levels of from 2 to 10% by weight of the composition, preferably 4 to 6%.

The solvent system can optionally contain, in combination with the solvent described hereinabove, water-soluble CARBITOL® solvents or water-soluble CELLOSOLVE® solvents. Water-soluble CARBITOL® solvents are compounds of the 2-(2-alkoxyethyoxy)ethanol class wherein the alkoxy group is derived from ethyl, propyl or butyl; a preferred water-soluble carbitol is 2-(2-butoxyethoxy)ethanol also known as butyl carbitol. Water-soluble CELLOSOLVE® solvents are compound of the 2-alkoxy ethanol class, with 2-butyl ethanol being preferred.

Suitable solvents to be used with the solvents of the invention are also benzyl alcohol, and diols such as 2-ethyl-2,3-hexanediol and 2,2,4-trimethyl-1,3-pentanediol.

The above-described co-solvents can be used in levels ranging from 0.1 to 5% of the composition.

The compositions herein are substantially free of terpene-solvents. Inasmuch as solvents are generally used at levels exceeding about 2%, terpenes cannot be incorporated in the claimed compositions in such proportions. It is understood, however, that relatively minor sub-additive levels of terpenes, e.g., below about 0.6% (calculated on the total cleanser composition), can be present originating from conventional ingredients such as perfumes.

Optional Ingredients - In addition to the essential ingredients listed hereinbefore, the present composition can contain additional components, which can be highly desirable.

For example, it is highly preferred that the compositions contain a detergent builder and/or metal ion sequestrant. Compounds classifiable and well-known in the art as detergent builders include the nitrilotriacetates, (NTA), ethylene diamine tetracetate (EDTA), amino-polyphosphonates (DEQUEST), water-soluble phosphates such as tri-polyphosphate and sodium ortho-and pryo-phosphates, silicates, and mixtures thereof. These builders are preferably not used in combination with strong abrasives like calcium carbonate, but are recommended in combination with soft organic abrasives like polyvinylchloride.

Metal ion sequestrants of lower metal sequestration constant can advantageously be used in combination with strong or soft abrasives. Those metal ion sequestrants include polycarboxylates, citrates. Preferred builders/sequestrants for use in the present invention are NTA, EDTA, citrates and mixtures thereof. The builders/sequestrant will be present at levels of from 1% to 15%, preferably from 2% to 7%.

It is highly preferred, as well, to include soaps in the compositions of the invention. Soaps prepared from coconut oil fatty acids are preferred.

Soaps are used in amounts ranging from 0.2% to 3% by weight of the composition, preferably in an amount in excess of 1%, typically from 1% to 2% by weight.

This level is clearly above levels currently used in similar compositions, since it has surprisingly been discovered that the presence of soaps at these higher levels not only provides suds control, but also has a thickening effect on the compositions containing the specific organic solvent of the invention. This finding allows to keep the amount of thickener at a very low level, thus substantially reducing certain drawbacks of thickeners, such as rinsing difficulties resulting from their use at substantial levels.

Thickeners should preferably be included in the compositions of the invention, in order to suspend the abrasive. However, the level will be kept under 2%, preferably from 0.2% to 1.5%. Common thickeners such as the polyacrylates, xanthan gums, carboxymethyl celluloses, swellable smectite clays, and the like, can be used herein.

Optional components also represented by ingredients typically used in commercial products to provide aesthetic or additional product performance benefits. Typical ingredients include pH regulants, perfumes, dyes, optical brighteners, soil suspending agents, detersive enzymes, gel-control agents, freeze thaw stabilizers, bactericides, preservatives, and the like.

Another optional ingredient for use herein is represented by conventional detergent hydrotropes. Examples of suitable hydrotropes are urea, monoethanolamine, diethanolamine, triethanolamine and the sodium potassium, ammonium and alkanol ammonium salts of xylene-, toluene-, ethylbenzene-and isopropyl-benzene sulfonates. It is a particular feature of the present invention, however, that stable formulations can be prepared without the need for hydrotropic materials of this kind.

The compositions herein typically contain up to about 90% water as a carrier. By way of example the water-level can vary in the range from e.g. 50% to 80%. Water-alchol (e.g., ethanol, isopropanol, butanol, etc.) mixtures can also be used. Alkylated polysaccharides can be used to increase the stability and performance characteristics of the compositions.

The compositions herein are preferbly formulated in the alkaline pH range, generally in the range of pH 8-11, preferably about 10-10.8. Caustics such as sodium hydroxide and sodium carbonate can be used to adjust and buffer the pH as desired.

The following examples are given by way of illustrating the compositions herein, but are not intended to be limiting of the scope of the invention.

Abbreviations

NaPS	Sodium C_{13} to C_{16} paraffin sulfonate
LAS	Sodium salt of linear C_{11}-C_8 alkyl benzene sulfonate
LAB	Linear C_{10-22} alkyl benzene
Lutensol® AO7	Condensate of 1 mole C_{12}-C_{14} fatty alcohol with 7 moles of ethylene oxide
Dobanol® 45/7	C_{14}-C_{15} oxoalcohol with 7 moles of ethylene oxide per mole of alcohol
HC_nFA	Narrow cut, hardened, coconut fatty acid
NTA	Sodium nitrilotriacetate
EDTA	Ethylene diamine tetraacetate
$CaCO_3$	Calcium carbonate
Sokolan®PHC 25	Crosslinked polyacrylate thickener
ETHD	2-Ethyl-1,3-hexanediol
TMPD	2,2,4-trimethyl-1-3-pentanediol
PVC	Polyvinylchloride

Creamy cleansers were prepared by mixing the listed ingredients in the stated proportions (% by weight).

Ingredients	Comp. A	Ex. I
LAS	0.5	4.0
NaPS	3.0	-
Lutensol®AO7	0.3	-
Na_2CO_3	3.0	-
HC_nFA	0.2	1.2
Benzyl alcohol	1.5	-
Orange terpenes	2.0	-
1-Butoxypropane-2-ol	-	5.0
NTA	-	4.0
$CaCO_3$	30.0	-
PVC	-	10.0
Sokolan®PHC25	0.6	0.4
Water + minors	up to 100	

The above compositions were comparatively tested on synthetic soils representative of typical hard surface household soils. The test-soils were prepared as follows.

a) HBTS soil: is composed of 250 ml isopropyl alcohol, 75g calcium stearate powder and 0.5g carbon black. It is applied on an enamel-coated metal plate (cleaned with a detergent and then with alcohol) with a paint roller, and the plates are baked at 180°C for 20 minutes.

b) KD soil: is composed of 25% HSW® soil with carbon black (2), 37.5% Crisco® (1) oil, 37.5% Puritan® (1) oil. This soil is rolled onto stainless steel plates (beforehand cleaned with a detergent and then with alcohol) using a paint roller. A very thin uniform layer is needed since the soil is difficult to cure.

The plates are placed in the oven at 115°C ("soft soil") or 170°C ("hard soil") for 2 hours and then allowed to age at least 1 day.

(1) commercial cooking oil sold by The Procter & Gamble Company

(2) commercial soil sold by Chem Pack Inc., U.S.A.

The testing conditions were as follows:

The test was run with the aid of an Erichsen washability machine. A sponge of approximately 0.5 x 5 x 4 cm was used after being carefully washed under hot running water and squeezed through drying rolls. 5g of the undiluted cleanser to be tested was spread over one side of the sponge. The number of strokes of the cleaning machine varied with the type of soil. Performance readings were done as soon as visible cleaning diffrences became noticeable. The gradings were done visually by three judges working independently. The performance benefits were established via paired comparison with duplicates as follows. A 0-4 scale was used whereby: 0 means no difference; 1 = probable difference; 2 = consistent difference; 3 = clear difference; 4 = big difference.

The testing results were as listed below. Prior art composition A was the reference against which the composition of example I was compared.

Soil	Comp. A	Ex. I
KD	Ref.	+ 0.5
HBTS	Ref.	+ 2.0

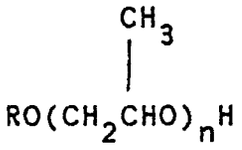
The above test clearly confirms the significant performance benefits derivable from the inventive compositions vs. related art composition.

In addition, the following compositions are prepared:

Ingredients	Ex. II	Ex. III	Ex. IV	Ex. V	Ex. VI	Ex. VII	Ex. VIII
LAS	4.0	4.0	0.5	3.0	0.5	3.0	4.0
NaPS	–	–	3.0	1.0	3.0	1.0	–
Lutensol® AO7	–	–	0.3	–	0.2	–	–
$NaCO_3$	3.0	–	3.0	–	3.0	3.0	–
HCnFA	1.2	1.2	1.2	1.5	1.5	1.2	1.2
Benzyl alcohol	–	–	–	1.0	–	–	–
Butyl carbitol	–	–	–	–	1.0	–	–
ETHD	–	–	1.0	–	–	–	–
TMPD	–	–	–	–	1.0	1.0	–
1-Butoxypropane-2-ol	–	–	2.0	–	3.0	2.0	5.0
1(2-Butoxy-1-methyl-ethoxy)propane-2-ol	5.0	5.0	–	4.0	–	–	–
NTA	4.0	4.0	3.0	1.0	2.0	–	–
EDTA	–	–	1.0	1.0	1.0	–	2.0
Citrate	–	–	1.0	3.0	2.0	3.0	–
$CaCO_3$	30.0	–	30.0	–	–	30.0	–
PVC	–	10.0	–	10.0	10.0	–	10.0
Sokolan® PHC25	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Water + minors	up to 100						

Claims

1. A viscous, creamy scouring cleanser containing a surface-active agent, an organic solvent, an abrasive, and if desired conventional additives, characterized in, that said cleanser is substantially free of terpene-solvents; and that the organic solvent is represented by the formula:



wherein R is a C_1 to C_8 alkyl, alkenyl or alkyl aryl group, preferably a C_1 to C_4 alkyl group, and n is an integer from 1 to 4.

2. A composition in accordance with Claim 1 wherein R is C_1 to C_4 alkyl group, and n is 1 or 2.

3. A composition in accordance with Claims 1 and 2 wherein the organic solvent is 1-n-butoxypropane-2-ol or is 1(2-n-butoxy-1-methyl ethoxy)propane-2-ol, or is a mixture thereof.

4. A composition in accordance with Claims 1-3 wherein the organic solvent is present at levels of from 2% to 10% by weight.

5. A composition in accordance with Claims 1-4 which contains from 1 to 15% by weight of a detergent builder and/or metal ion sequestrant.

6. A composition in accordance with Claim 5 wherein said detergent builder and/or metal ion sequestrant material is selected from nitrilotriacetate, ethylene diamine tetraacetate, citrate, and mixtures thereof.

7. A composition in accordance with Claims 1-5 which contains from 0.2% to 3% of a fatty acid soap.

8. A viscous creamy scouring cleanser containing
-from 3% to 5% by weight of organic surface-active agent;
-from 1% to 2% by weight of fatty acid soap;
-4% to 6% by weight of an organic solvent selected from 1-n-butoxypropane-2-ol, 1(2-n-butoxy-1-methyl ethoxy)propane-2-ol, and mixtures thereof;
-from 2% to 7% by weight of a detergent builder and/or metal ion sequestrant material selected from nitrilotriacetate, ethylene diamine tetraacetate, citrate, and mixtures thereof.