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(54) **Cleaning with short-chain surfactants**

(57) A cleaning composition comprising an anionic surfactant system consisting of at least a short-chain anionic surfactant and a long-chain anionic surfactant.

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DescriptionTECHNICAL FIELD

5 **[0001]** The present invention relates to cleaning compositions comprising an anionic surfactant system. While not limited to any particular type of cleaning operation, the compositions herein are especially useful as hard surface cleansers, e.g., for use on tiles walls, countertops, floors and the like. The compositions which contain hypochlorite bleach are especially useful for removing kitchen and bathroom dirt, including the greasy soap scum-types of soils that are associated with bathtubs, shower stalls and bathroom sinks.

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BACKGROUND OF THE INVENTION

[0002] When considered superficially, it might appear that the formulation of cleaning compositions of various types would be a matter of routinely selecting various deterative surfactants, deterative bleaches and various deterative adjuncts from the wide variety of such materials known in the art, and combining them to achieve whatever level of cleaning performance is desired. However, on further investigation it is found that this is not the case, especially when superior cleaning is desired. Various bleaches can be used in cleaning, but may be incompatible with various surfactants.

15 **[0003]** The formulation of superior cleaning products for use in kitchens and bathrooms provides special challenges, inasmuch as kitchen soils tend to carry a heavy load of greasy and protein-based materials, and bathroom soils tend to carry a heavy load of "soap scum" materials.

20 **[0004]** The present invention relates to a cleaning composition comprising an anionic surfactant system. Relevant prior art includes WO94/10272 which describes a cleaning composition comprising a mixture of a short-chain surfactant and a long-chain surfactant. The surfactants described in WO94/10272 are linear. The short-chain surfactants are preferably anionic, whereas the long-chain surfactants are preferably amphoteric (amine oxides). EP 812 904 describes a cleaning composition comprising a surfactant system comprising a short-chain and a long-chain surfactant. Preferred surfactants are anionic which contain no functionalities which are susceptible of oxidation.

25 **[0005]** According to the present invention, it has been found that a surfactant system comprises at least two anionic surfactants can provide additional cleaning benefit. The anionic surfactants selected for use in the system are a short-chain linear anionic surfactant and a long-chain branched anionic surfactant. The system provides improved cleaning performances, especially on greasy or oily soils.

SUMMARY OF THE INVENTION

35 **[0006]** The present invention relates to a cleaning composition comprising a surfactant system of at least a short-chain linear anionic surfactant and a long-chain branched anionic surfactant.

[0007] The invention also provides a method of cleaning a surface using the above composition.

DETAILED DESCRIPTION OF THE INVENTION

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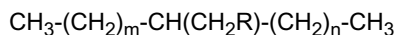
[0008] The present invention requires a surfactant system consisting of at least a short-chain linear anionic surfactant and a long-chain branched anionic surfactant. The short-chain linear surfactants (hereinafter referred to as SLS) can be selected from sulphates, sulphonates, alkoxyated-sulphates and phosphates. Where the SLS is an alkoxyated-sulphate, the alkoxylation can be propoxylation, but is preferably ethoxylation. The SLS comprises from 5 to 9 carbon atoms, preferably 7 to 9 carbon atoms.

45 **[0009]** Preferred SLS are the C₅-C₉ alkyl sulfates and the C₅-C₉ alkyl sulfonates. A preferred SLS is C₇-C₉ sulphate available from Albright and Wilson available under the tradename Empimin LN.

[0010] The long-chain branched anionic surfactant (hereinafter referred to as LBS) comprises a carbon backbone, at least one branching group and an anionic group. The carbon backbone comprises from 10 to 16 carbon atoms, more preferably 10 to 14 carbon atoms, most preferably 11 to 13 carbon atoms. The carbon backbone is preferably a saturated alkyl group, but may be substituted. The branching group is also preferably saturated alkyl, but may be substituted. Where substituted, preferred substituent groups include alkoxy or anionic groups. The branching groups comprise from 1 to 13 carbon atoms, more preferably from 1 to 4 carbon atoms and are most preferably methyl. The anionic group is selected from the group consisting of sulphates, sulphonates, alkoxyated-sulphates, phosphates or mixtures thereof as described above. Where the LBS is an alkoxyated sulphate, the alkoxylation can be propoxylation, but is preferably ethoxylation. Particularly preferred LBS are based on Isalchem 123 and they are available from Albright and Wilson. Isalchem 123 contains a carbon backbone having from 11 to 12 carbon atoms, one branching group which consists of a substituted methyl group wherein the substituent group is also the anionic group. This material can be

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described as



5 where n and m are independently between 0 and 9, $n+m=8-9$, R is SO_4 , PO_4 , SO_3 .

[0011] In another aspect of the present invention the surfactant system comprises a short-chain anionic surfactant (hereinafter referred to as SBS) in addition to the SLS and LBS. Examples of suitable SBS include sulphates, sulpho-

10 nates and phosphates. A preferred SBS is a short-chain branched sulphate. Where present, the SBS is most preferably 2-ethyl-hexyl sulphate available from Albright and Wilson under the tradename Empicol 0585/A.

[0012] The anionic surfactant system of the present invention is preferably present at a level of from 0.1% to 20%, more preferably 0.5% to 10%, most preferably 1% to 6% by weight of the cleaning composition.

[0013] Typically the ratio of SLS to LBS is from 30:1 to 1:3, more preferably from 10:1 to 1:2, most preferably from 3:1 to 1:1. Where present the ratio of SLB and LBS to SBS is from 50:1 to 1:50 and more preferably from 10:1 to 10:1.

[0014] All percentages, ratios and proportions recited herein are by weight, unless otherwise specified. All cited

15 documents are incorporated herein by reference.

Bleach

[0015] Preferred cleaning compositions according to the present invention comprise a bleach. More preferably the

20 compositions comprise a hypochlorite bleach which is available as a standard aqueous solution and at pH 12-13. If used, the typical levels of hypochlorite in the composition will be from 0.5% to 2.5% (or as high as 3% for the most stable surfactant amounts and proportions) by weight of the compositions.

Thickener

[0016] The compositions of the present invention may optionally be prepared with or without thickener. It is preferred to have a thickener present in order to promote adhesion of the composition to the surface being cleansed. While various thickeners may be used, it is preferred for stability reasons to employ a polycarboxylate thickener. Preferred polycarboxylate thickeners are cross-linked polyacrylic acid thickeners. These thickeners are especially preferred when

30 the composition additionally comprises hypochlorite bleach. One such thickener is available from the 3-V Chemical Corporation under the tradename POLYGEL DR or from BFGoodrich under the tradename Carbopol ETD2691. This thickener is an anionic carboxy vinyl polymer which is in the form of a fine white powder which, after full or partial neutralization with alkali, forms viscous solutions or gels which are compatible with electrolytes. It has now been determined that such viscous solutions are also stable with hypochlorite bleach, especially in the presence of sodium benzoate stabilizer. If used, the typical usage levels of polymeric thickener will be from 1% to 10%, more preferably 0.5% to 5%, most preferably from 0.7% to 2% by weight of the composition.

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[0017] Other thickeners useful herein both with and without hypochlorite include clays, especially bentonite, hectorite or other montmorillonite clays. Commercial clays suitable for use herein include HECTABRITE DP, MAGNABRITE HV, POLARGEL HV, VOLCLAY NF-BC, LAPONITE XLS, BENTONE EW and GELWHITE H-NF. Typical usage levels to

40 achieve thickening are at least 1.0%, and range from 1.0% to 2.5% of the compositions herein.

[0018] Thickened solution viscosities is preferably in the range from 10 cps to 4000 cps, more preferably from 50 to 1000cps, most preferably from 100 to 550cps when measured using a Carrimed Rheometer at 25 °C and a shear rate of from 10 to 100 s^{-1} .

Fluid Carrier

[0019] The compositions of the present invention will preferably comprise from 85% to 95%, by weight of a fluid carrier, preferably water. Water/alcohol (e.g., ethanol; isopropanol) mixtures can also be employed in liquid formulations which do not contain the chlorine bleach.

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Optional Adjunct Materials

[0020] The compositions according to the present invention may comprise a number of optional ingredients such as bleaching agents, additional surfactants, fatty acids, radical scavengers, antimicrobial compounds, builders, chelants, buffers, bactericides, solvents, enzymes, hydrotropes, colorants, bleach activators, soil suspenders, dye transfer agents, brighteners, anti dusting agents, dispersants, dye transfer inhibitors, pigments, perfumes and dyes.

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[0021] A highly preferred optional ingredient according to the present invention is a hypochlorite bleaching agent, preferably an alkali metal hypochlorite. Advantageously, the compositions of the invention are stable in the presence of

this bleaching agent. Although alkali metal hypochlorites are preferred other hypochlorite compounds may also be used herein and can be selected from calcium and magnesium hypochlorite. A preferred alkali metal hypochlorite for use herein is sodium hypochlorite. If necessary components may be added to the composition that improve the stability of the bleach for example periodic acid. Compositions according to the present invention may comprise hypochlorite bleaching agents such that the content of active chlorine in the compositions is from 0.1% to 4%, preferably from 0.5% to 2% by weight.

[0022] Another optional component of the present invention is an alkali metal salt of a C₈-C₁₈ fatty acid. Said fatty acids are used as suds suppressors. Suitable fatty acids for use herein can be any C₈-C₁₈ fatty acid, preferably fully saturated, preferably a sodium, potassium or lithium salt, more preferably the sodium salt. Examples of suitable fatty acids are those widely available in the field. Other suitable suds suppressors include C10-18 alkoxyated capped alcohols. Most preferably however the suds suppressor consists of a mixture of fatty acid, preferably coconut fatty acid (e.g. Prifac 5900 available from Unichem) and alkoxyated capped alcohol, preferably C12-14 ethoxy butoxy methyl ether (e.g. Plurafac LF231 available from BASF). Compositions according to the present invention comprise from 0.1% to 2%, preferably less than 0.6% by weight of the composition of fatty acids.

[0023] A further optional component of the present invention is a radical scavenger. Said radical scavengers are used as stabilisers. A suitable radical scavenger for use herein is the aromatic molecule containing a carboxylic group ring substitution. Suitable examples of radical scavengers for use herein include the meta and para-chlorobenzoic acid, benzoic acid, meta- ortho- and para-methoxybenzoic acid, meta nitrobenzoic acid, para bromobenzoic acid, salicylic acid, 5-sulphosalicylic acid, 3,5-dimethyl salicylic acid and paratoluic acid. Of the above materials, ortho-methoxybenzoic acid is preferred. Compositions according to the present invention comprise from 0.01% to 1.5% by weight, preferably from 0.1% to 0.8% by weight and more preferably from 0.2% to 0.5% by weight of the composition of radical scavengers.

[0024] An optional requirement of the compositions according to the present invention is that the pH is greater than 10, preferably greater than 11, more preferably greater than 12. This is achieved by the addition of from 0.4% to 2% of a caustic alkali. Suitable caustic alkalis for use herein include sodium and potassium hydroxide. Compositions according to the present invention comprising hypochlorite preferably have a pH greater than 12 for hypochlorite stability.

[0025] The compositions according to the present invention are preferably aqueous and preferably comprise from 80% to 95%, more preferably from 85% to 90% of water.

It is one of the advantages of the present invention that enhanced cleaning performance can be achieved by the addition of the short-chain surfactants herein without otherwise causing the formulator to resort to the use of unconventional ingredients and detergent adjuncts. Accordingly, while the foregoing listing of Optional Adjunct Materials is instructive, it is by no means intended to be limiting of the invention, and other such materials can also be used herein.

[0026] The compositions according to the present invention are prepared by methods well known in the art such as the methods described in GB 1 329 086 with the exception of the polymer being pre-dispersed in an acidic water solution of pH 3 and then neutralised up to pH 7 before starting adding the other components. The compositions according to the present invention can then be prepared by mixing all of the ingredients in a non-metallic apparatus at room temperature or in warm water. If fatty acid is used, it is melted before being added to the mixture. Preferably, the surfactant blend is first prepared by adding the short chain surfactant to the long chain surfactants. Other optional ingredients such as perfume and the alkali metal hypochlorite are then added whilst stirring. Colourants, if present, are added after all the other ingredients have been mixed.

[0027] The compositions according to the present invention preferably have a viscosity of from 10 cps to 4000 cps, more preferably from 50 cps to 2000 cps, most preferably from 150 cps to 1000 cps measured with a Carrimed Rheometer at a temperature of 25°C and a shear rate of 15-100 s⁻¹. Where the composition is in a sprayed form, the viscosity of said spraying compositions is preferably of from 15 cps to 40 cps.

[0028] The compositions of the present invention may be used for a variety of cleaning purposes such as cleaning hard surfaces whereby said compositions thickened nature results in longer adhesion to the surface than non-thickened compositions. By "hard surface" it is meant herein any surface like bathroom, sanitary fittings such as sinks, showers, wash basins and WCs, kitchen, sinks, cooker tops, table tops, refrigerators, walls, windows and the like.

Packaging form of the compositions

[0029] The compositions herein may be packaged in a variety of suitable detergent packaging known to those skilled in the art. The liquid compositions herein may desirably be packaged in manually operated spray dispensing containers, which are usually made of synthetic organic polymeric plastic materials. Accordingly, the present invention also encompasses liquid cleaning compositions of the invention packaged in a spray dispenser, preferably in a trigger spray dispenser. Indeed, said spray-type dispensers allow to uniformly apply to a relatively large area of a surface to be cleaned the liquid cleaning compositions suitable for use according to the present invention; thereby contributing to the cleaning properties of said compositions. Such spray-type dispensers are particularly suitable to clean vertical sur-

faces. Surprisingly, the spraying of a liquid composition containing a polycarboxylate polymer, contrary to compositions which do not contain the polycarboxylate polymer, has been seen beneficial for preventing or reducing inhalation of the composition by the user as said composition is sprayed.

[0030] The present advantage is preferably observed where the cleaning composition is as defined hereinbefore. Accordingly, the use of a polycarboxylate polymer in a liquid cleaning composition is provided, said composition being in a sprayed form, for preventing or reducing inhalation of said composition by the user as said composition is sprayed. Preferably, the liquid cleaning composition is as defined hereinbefore.

[0031] Suitable spray-type dispensers to be used according to the present invention include manually operated foam trigger-type dispensers sold for example by Specialty Packaging Products, Inc. or Continental Sprayers, Inc. These types of dispensers are disclosed, for instance, in US-4,701,311 to Dunning et al. and US-4,646,973 and US-4,538,745 both to Focarracci. Particularly preferred to be used herein are spray-type dispensers such as T 8500[®] or T 8900[®] commercially available from Continental Spray International or T 8100[®] commercially available from Canyon, Northern Ireland. In such a dispenser the liquid composition is divided in fine liquid droplets resulting in a spray that is directed onto the surface to be treated. Indeed, in such a spray-type dispenser the composition contained in the body of said dispenser is directed through the spray-type dispenser head via energy communicated to a pumping mechanism by the user as said user activates said pumping mechanism. More particularly, in said spray-type dispenser head the composition is forced against an obstacle, e.g. a grid or a cone or the like, thereby providing shocks to help atomise the liquid composition, i.e. to help the formation of liquid droplets.

[0032] The present invention further encompasses a method for cleaning a hard surface by applying on said surface an effective amount of a composition of the invention. The said composition may be applied in its neat form or after having been diluted with water. Preferably said composition is diluted up to 200 times its weight of water, preferably into 50 to 150 times its weight of water and more preferably 75 to 95, before it is applied to said surface. When the composition is diluted prior to use (to reach a total active level in the order of 1.2%), the composition will still advantageously provide effective cleaning performance. In the preferred embodiment of the method of the present invention wherein said composition is applied to a hard-surface to be cleaned in its diluted form, it may not be necessary to rinse the surface after the composition has been applied.

[0033] Having thus described the invention in substantial detail, the following Examples are included to further illustrate the practice of the invention, but are not intended to be limiting thereof.

Examples

[0034] The examples provided below are not intended to be limiting and merely provide an example of the sort of formulation that is envisaged by the Applicant. All amounts are listed in % weight of the total composition.

	A	B	C
polymer #1	1.0	-	1.0
polymer #2	0.1	-	0.1
polymer #3	-	1.5	-
SLS	1.5	1.5	3.0
Capped nonionic alcohol (Plurafac LF231 from BASF)	-	-	0.1
Coconut fatty acid (Prifac 5900 from Unichema)	-	-	0.1
SBS	1.5	1.5	-
LBS	1.0	1.0	1.0
Citrus Bleach PCMF perfume	0.3	0.3	0.2
Hypochlorite	1.0	1.0	1.0
Caustic	1.0	1.0	1.0
Green dye	0.0058	0.0058	0.0058

(continued)

	A	B	C
Periodic acid	0.01	0.01	0.01
Sodium silicate	0.4	0.4	0.4
Deminerlized water	Balance	Balance	Balance
SLS is heptyl-nonyl sulfate Empimin LN from A&W LBS is C12-C13 branched sulfate based on Isalchem123 SBS is 2 ethyl-hexyl sulfate Empicol 0585/A from A&W polymer #1 is Polygel DR from 3Vsigma polymer #2 is Polygel W30 from 3Vsigma polymer #3 is Carbopol ETD2691 from Goodrich			

Claims

1. A liquid cleaning composition comprising a surfactant system consisting of at least a linear short-chain anionic surfactant and a branched long-chain anionic surfactant.
2. A cleaning composition according to claim 1 wherein the short-chain surfactant comprises from 5 to 9 carbon atoms.
3. A cleaning composition according to any preceding claim wherein the long-chain surfactant comprises a carbon backbone, at least one branching group and an anionic group.
4. A cleaning composition according to claim 3 wherein the carbon backbone comprises from 10 to 16 carbon atoms.
5. A cleaning composition according to either of claims 3 or 4 wherein the branching group of the long-chain surfactant comprises from 1 to 13 carbon atoms.
6. A cleaning composition according to any of the preceding claims wherein the anionic surfactants are selected from alkali metal or alkaline earth metal sulphates, sulphonates, alkoxyates sulphates, phosphates or mixtures thereof.
7. A cleaning composition according to any preceding claim wherein the ratio of short-chain linear to long-chain branched surfactant is 30:1 to 1:3.
8. A cleaning composition according to any preceding claim additionally comprising a short-chain branched surfactant.
9. A cleaning composition according to any preceding claim additionally comprising a thickener, preferably a polycarboxylate thickener.



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 87 0207

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D, Y	EP 0 812 904 A (PROCTER & GAMBLE) 17 December 1997 * claims; examples * ---	1-9	C11D1/00 C11D17/00 C11D1/37 C11D3/37
Y	WO 85 02175 A (MONSANTO CO) 23 May 1985 * claims 7,23,27,28,33,38; example 31 * ---	1-9	
A, D	WO 94 10272 A (PROCTER & GAMBLE) 11 May 1994 * page 9, line 4 - line 35; claims 1,2,8-13; examples VII, VIII * ---	1-9	
A	US 4 071 463 A (STEINHAEUER ALFRED F) 31 January 1978 * claims 1,7 * -----	1,6,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			C11D
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	29 March 1999	Loiselet-Taisne, S	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		& : member of the same patent family, corresponding document	

EPO FORM 1503 03/82 (P/4C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 87 0207

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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29-03-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0812904 A	17-12-1997	WO 9747714 A	18-12-1997
WO 8502175 A	23-05-1985	EP 0161251 A	21-11-1985
WO 9410272 A	11-05-1994	CA 2148469 A	11-05-1994
		EP 0667892 A	23-08-1995
		JP 8503013 T	02-04-1996
US 4071463 A	31-01-1978	NONE	