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(54) Bleaching composition.

(57) A bleaching composition is a perfumed aqueous solution of alkali metal hypochlorite containing alkane sulphonate with alkyl ether sulphate and/or soap. Amine oxide and hydrotropes are unnecessary and the amount of amine oxide (if any) is limited to half the amount of other surfactants.

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BLEACHING COMPOSITION

This invention relates to hypochlorite-based aqueous liquid bleaching compositions.

It is well known to include both hypochlorite bleach and surfactant in the same compositions.

We have now found that useful properties, in particular useful combinations of properties, can be obtained using a mixture of specified anionic surfactants.

We have found that including alkyl ether sulphate and/or soap in surfactants present enhances the ability of the composition to dissolve perfume. Of course the incorporation of perfume is generally desired for compositions intended for domestic use. We have also found that incorporation of some alkyl ether sulphate can improve the ability of the composition to remove a number of stains.

According to this invention there is provided a perfumed aqueous liquid solution of alkali metal hypochlorite, also containing a surfactant mixture comprising

(i) an alkane sulphonate of formula $R\text{-}SO_3M$ in which R is an alkyl group with 8 to 22 carbon atoms and either

(ii) an alkyl ether sulphate of formula $R^1\text{-}(OC_2H_4)_n\ SO_4M$ in which R^1 is an alkyl group with 8 to 20 carbon atoms and n has a value in the range from 0.5 to 12, and/or

(iii) soap of formula R^2CO_2M where R^2 is an alkyl or alkenyl group of 7 to 19 carbon atoms,

each M denoting a solubilising cation;

the amounts of the said surfactants, by weight based on the whole composition, being

i) alkane sulphonate 1 to 10%

ii) alkyl ether sulphate 0 to 3%

iii) soap 0 to 3%

but the total of (ii) and (iii) being 0.1 to 4%, the amount of amine oxide (if any) in the composition being less than half the content of other surfactants.

Commercial supplies of alkali metal hypochlorite solution contain varying amounts of sodium chloride. We prefer to use hypochlorite solution which has a fairly low content of sodium chloride. We have then found it possible to prepare compositions which contain a substantial proportion of surfactant.

One category of surfactant which has been used extensively for (thickened) hypochlorite compositions is the amine oxides. The use of these is discussed in our UK patent 1329086 which explains that the amine oxides can function like a hydrotrope (although they are normally regarded as surfactants). We have found it unnecessary to include amine oxide or hydrotrope. It is a feature of this invention that the proportion by weight of any amine oxide is less than half the amount of other surfactant. Preferably amine oxide is entirely absent. It is also preferred that compositions of the invention are devoid of hydrotropes such as urea, alcohols with up to four carbon atoms, or short chain alkylaryl sulphonates, e.g. with no more than four carbon atoms in the alkyl group(s). If any such hydrotrope is present, the proportion by weight of it may be less than the amount of surfactants (other than amine oxide, if any) present, better less than half the amount of surfactants other than amine oxide. In any case, it is desirable to exclude urea and primary or secondary alcohols because these are not stable in the presence of hypochlorite.

The alkane sulphonate used in this invention has the formula:

$$R\text{-}SO_3M$$

where R is an alkyl group of 8 to 22. Preferably R has 12 to 22, carbon atoms and the solubilising cation M is preferably alkali metal. Preferably R is a secondary alkyl group. It may be branched but preferably is unbranched.

The amount of the alkane sulphonate lies in the range from 1 to 10% by weight of the composition. The amount may possibly be not more than 8%, e.g. 2% to 6%.

Alkyl ether sulphate useful in this invention has the formula:

$$R^1\text{-}(OC_2H_4)_nOSO_3M$$

where M is a solubilising cation, especially alkali metal, R^1 is an alkyl group of 8 to 20, preferably 10 to 16, carbon atoms and n has an average value in the range from 0.5 to 12, better 1 to 6, even better 2 to 5. R^1 may be primary or secondary, and preferably is unbranched.

Soap useful in this invention has the formula:

$$R^2CO_2M$$

where M is a solubilising cation, especially alkali metal and R^2 is an alkyl group of 7 to 19, preferably 9 to 15, carbon atoms. Olefinic unsaturation should desirably be absent, for the sake of stability in the presence of hypochlorite.

The total amount of soap and alkyl ether sulphate lies in the range from 0.1, preferably 0.2, to 4% by weight of the composition. If alkyl ether sulphate is present, the amount will generally be at least 0.1% by weight. Simi-

larly, if soap is present, the amount will generally be at least 0.1%. The weight ratio of alkane sulphonate to the total of alkyl ether sulphate and soap is preferably from 1:1 to 10:1 better 2:1 to 6:1.

R, R^1 and R^2 can, but do not need to be, the same, but preferably R^1 and R^2CO_2 both have an average carbon chain length of 10 to 16 carbon atoms and may be predominantly of 12 carbon length.

The hypochlorite is desirably included in a quantity to provide from 0.1 to 8%, better 0.5 to 3% or 5% of available chlorine, by weight based on the whole composition. It is desirable to use hypochlorite in which the amount of available chlorine is at least twice the amount of any sodium chloride present. One supplier of suitable hypochlorite is Tahn and Mulhouse.

The composition will generally be alkaline. For this purpose alkali metal hydroxide may be included in a quantity between 0.1 and 1.5% by weight of the composition.

The amount of perfume dissolved in the composition, made soluble by the presence of alkyl ether sulphate and/or soap may lie in the range from 0.1 to 1.0% by weight of the composition. Preferably the amount of perfume is up to 0.6 or 0.7%.

A preferred composition according to this invention may have constituents and quantities as set out below.

	Preferred Percentage of Active Matter
Secondary alkane sulphonate	1 to 6%
Alkyl ether sulphate	0.2 to 2%
Soap	0.2 to 2%
Alkali metal hypochlorite (expressed as available chlorine)	0.5 to 2%
Sodium chloride	less than 1%, and also less than half the weight of available chlorine
Sodium hydroxide	0.2 to 1.0%
Perfume	0.1 to 0.6%
Water	balance to 100%

Various other constituents are possible. Notable is 0.1 to 0.5% of alkali metal silicate. The pH of the composition is, suitably, greater than 11. This will give a lesser alkaline pH on dilution, especially when dilution is with hard tap water.

The invention is illustrated by the following Examples in which percentages are by weight based on the whole composition unless otherwise stated.

Example 1

A number of compositions were prepared using the following constituents:

Secondary alkane sulphonate (SAS) with average 16-18 carbon atoms

Linear alkyl ether sulphate (LES) in which the alkyl group has average 12-13 carbon atoms and the average degree of ethoxylation is 3

Lauric soap

Sodium hydroxide

Perfume

A sodium hypochlorite solution which had the following characteristics as supplied:

Available chlorine	over 315 g/litre
NaOH	10-20 g/litre

Specific gravity	1-315 to 1-320
NaCl	80 to 120 g/litre

The various compositions were made up in distilled water. All compositions contained sufficient hypochlorite to yield 1% available chlorine. It was noted whether the compositions were cloudy or clear. Compositions and results are set out in the following Tables 1 and 2:

TABLE 1

	% by weight active matter						
Composition No:	1	2	3	4	5	6	7
Hypochlorite to yield available chlorine	1	1	1	1	1	1	1
SAS	2.0	2.0	2.8	2.0	2.0	3.9	2.0
Perfume	0.06	0.18	0.18	0.18	0.3	0.3	0.3
Lauric soap	-	-	-	0.26	-	-	0.58
LES	-	-	-	-	-	-	-
Sodium hydroxide	0.25	-	-	-	-	-	-
Result:	Cloudy	Cloudy	Cloudy	Clear	Cloudy	Cloudy	Clear

TABLE 2

	% by weight active matter					
Composition No:	1	8	9	10	11	12
Hypochlorite to yield available chlorine	1	1	1	1	1	1
SAS	2.0	2.0	5.0	2.0	2.0	2.0
Perfume	0.06	0.15	0.15	0.15	0.15	0.18
Lauric soap	-	-	-	0.50	-	-
LES	-	-	-	-	0.50	0.26
Sodium hydroxide	0.25	0.22	0.22	0.22	0.22	-
Result:	Cloudy	Cloudy	Cloudy	Clear	Clear	Clear

Comparison of compositions 2, 3 and 4 show that increasing the amount of SAS from 2.0 to 2.8% was not sufficient to render the perfume soluble but addition of 0.26% soap did bring about solution of the perfume. Composition 12 shows that addition of 0.26% LES also brought about solution of the perfume. Compositions 5, 6 and 7 show the same effect at higher concentrations. Increasing the SAS level to 2.0 to 3.9% was not enough to bring about solution of 0.3% perfume but addition of 0.58% soap did cause the perfume to dissolve.

The solubility of perfume is low when sodium hydroxide has been added as shown by composition 1. Comparison of compositions 8 and 9 shows that increasing the level of SAS to 5% was not enough to bring about the solution of perfume. Comparison also with compositions 10 and 11 shows that addition of 0.5% LES or 0.5% soap did dissolve the perfume.

Example 2

A number of compositions were prepared using the same constituents as in Example 1, although in addition all compositions included 0.2% sodium silicate. Compositions and results are set out in the following Table 3.

TABLE 3

Composition No:	% by weight active matter 13	14	15	16	17	18	19	20
Hypochlorite to yield available chlorine	1	1	1	1	1	1	1	1
SAS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Perfume	0.15	0.20	0.20	0.20	0.30	0.30	0.40	0.40
Lauric soap	-	0.10	0.20	0.40	0.40	0.50	0.70	0.80
LES	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sodium hydroxide	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sodium silicate	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Result:	Clear	Cloudy	Clear	Clear	Cloudy	Clear	Cloudy	Clear

Compositions 15, 16, 18 and 20 demonstrate that soap and LES can be used together to bring about the solubilisation of perfume.

Example 3

Compositions were prepared using the same materials as in Example 1, without sodium silicate, and with the amounts of the materials as set out in the following Table 4.

TABLE 4

	% by weight active matter			
Composition No:	21	22	23	24
Hypochlorite to yield available chlorine	1.0	1.0	1.0	1.0
SAS	2.0	5.0	5.0	6.0
Perfume	0.2	0.2	0.7	0.2
LES	0.5	2.0	2.5	1.5
Soap	-	1.5	0.5	2.0
Sodium hydroxide	0.5	0.5	0.5	-

All of these compositions were clear solutions.

Example 4

Compositions were prepared in distilled water using the same materials as in Example 1 without sodium silicate, and with the amounts of the materials as set out in the following Table 5.

TABLE 5

Composition No:	% active matter by weight C	D
Available chlorine	1.0	1.0
Sodium secondary alkane sulphonate	2.0	2.0
Alkyl ether sulphate	-	0.5
Amine oxide	-	-
Lauric soap	-	-
Sodium hydroxide	0.5	0.5

The compositions were used to remove various stains by a standard procedure. 1 ml of the composition was applied to a plastic tile bearing the stain. The tile was rubbed with the composition 200 times, using a machine to rub the tile. Each composition was used to clean three tiles bearing each stain. After the tiles had been cleaned in this way the effectiveness of cleaning was assessed by a panel of five evaluators whose assessments were averaged.

Composition D was found to be more effective than C on stains which were oil, two types of glue, vegetable fat and red pencil.

Stain	Cleaning Efficiency Best	Worst
Oil dag	D	C
Glue	D	C
Glue for label	D	C
Vegetaline	D	C
Red pencil	D	C

Example 5

The compositions of Example 2 were diluted with distilled water and used to wash a plastic tile. This was allowed to dry and the presence of streaks on the tile was assessed by the panel of evaluators. The amounts of composition diluted to one litre with water were 20, 25 and 50 grams. At each dilution composition D gave less streaking than composition C.

Claims

1. A perfumed aqueous liquid solution of alkali metal hypochlorite, also containing a surfactant mixture comprising

(i) an alkane sulphonate of formula $R\text{-}SO_3M$ in which R is an alkyl group with 8 to 22 carbon atoms and either

(ii) an alkyl ether sulphate of formula $R^1\text{-}(OC_2H_4)_n\ SO_4M$ in which R^1 is an alkyl group with 8 to 20 carbon atoms and n has a value in the range from 0.5 to 12, and/or

(iii) soap of formula R^2CO_2M where R^2 is an alkyl or alkenyl group of 7 to 19 carbon atoms,

each M denoting a solubilising cation;

the amounts of the said surfactants, by weight based on the whole composition, being

i) alkane sulphonate 1 to 10%

ii) alkyl ether sulphate 0 to 3%

iii) soap 0 to 3%

but the total of (ii) and (iii) being 0.1 to 4%, the amount of amine oxide (if any) in the composition being less than half the content of other surfactants.

2. A solution according to Claim 1 in which R^1 and R^2CO_2- each have an average of 10 to 16 carbon atoms.

3. A solution according to Claim 1 or Claim 2 wherein the content of sodium chloride is not more than half the amount of available chlorine by weight.

4. A solution according to Claim 1 or Claim 2 containing, by weight based on the whole composition:

i) alkane sulphonate 1 to 6%

ii) alkyl ether sulphate 0 to 2%

iii) soap 0 to 2%

Total of (ii) and (iii) 0.2 to 3%.

5. A solution according to Claim 4 wherein the content of sodium chloride is not more than half the amount of available chlorine by weight.

6. A solution according to any one of Claims 1 to 5 containing 0.1 to 0.6% by weight perfume.

7. A solution according to any one of the preceding claims wherein the content of hydrotrope is less than half the content of surfactant other than amine oxide (if any).

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 30 2262

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.5)
X	US-A-4 842 757 (P.F. REBOA et al.) * Abstract; column 6, line 49 - column 10, line 46; column 11, lines 35-45; column 13, lines 15-40; claims 1,5-7 *	1-7	C 11 D 3/395
X	EP-A-0 206 534 (THE CHLOROX CO.) * Abstract; page 5, line 16 - page 11, line 20; page 16, line 18 - page 23, line 7; page 24, line 14 - page 27, line 18; page 29, line 1 - page 32, line 28; page 35, line 4 - page 39, line 21; claims 1,2,6-15,18-21 *	1-7	
X,L	EP-A-0 304 328 (UNILEVER PLC) * Abstract; page 1, line 3 - page 4, line 1; exale 1; claims 1,2,7,8 * "L" document so quoted for it's casting doubt on the "first-deposit" characters of GB-9005873 and thus validity of the convention priority claim"	1-7	
X	FR-A-2 094 708 (F. MOREAU) * Complete *	1-7	TECHNICAL FIELDS SEARCHED (Int. Cl.5) C 11 D
A	FR-A-2 147 081 (BASF AG)		
A	EP-A-0 137 551 (UNILEVER PLC)		
A	WO-A-8 601 823 (LESIEUR-COTELLE)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13-06-1991	FISCHER W.H.F.

CATEGORY OF CITED DOCUMENTS

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

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

& : member of the same patent family, corresponding document

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