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(71) Applicant: **Chem-Y Fabriek van Chemische Producten B.V.**
Kupferstrasse 1
D-4240 Emmerich 1(DE)

(72) Inventor: **Van Paassen, Nicolaas A. I.**
Beiershof 13
Bodegraven(NL)

(74) Representative: **Elzas, Salomon, Drs. et al,**
Octrooibureau Polak & Charlouis Laan Copes van Cattenburch 80
NL-2585 GD The Hague(NL)

(54) **Cleaning agent based on active chlorine and alkali.**

(57) A cleaning agent based on active chlorine and alkali is provided containing a minor amount of a low-foaming compound of the formula $C_8H_{17}O\text{-}(C_2H_4O)_nCH_2COOM$, wherein M is sodium or potassium and n is a number having an average value of 1 – 10. Preferably the weight ratio between said compound and active chlorine is 1:10 tot 1:3.

EP 0 121 286 A2

CLEANING AGENT BASED ON ACTIVE CHLORINE AND ALKALI

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This invention relates to a cleaning agent based on active chlorine and alkali. Such cleaning agents are used in practice for cleaning pipes and ducts and the like, for instance of apparatuses for milk processing. Usually the cleaning occurs at 40 - 45°C and accordingly, the mixture should be preheated at a suitable temperature. Normally, no surfactants other than wetting agents are incorporated in such mixtures, because otherwise too much foaming would occur, particularly at the elevated temperatures and the intensive mechanical action, which accordingly would influence the cleaning action rather in a disadvantageous than in an advantageous way.

Such cleaning agents should be well discerned from the so-called thickened bleach compositions, such as disclosed in GB-A-2,076,010A and EU-A-0,072,600 which contain much more hypochlorite solution than alkali (vide page 2, line 25 of EU-A-0072600) and wherein the added surfactant serves for thickening the composition. The present compositions are intended for industrial use and contain alkali metal hydroxide in an amount of at least 50 % of the bleaching agent.

Surprisingly, it has now been found that a very restricted group of ethercarboxylic acid derivatives, when added to this kind of compositions, shows a combination of a very efficient surfactant action with a low foaming, which makes it possible to incorporate these compounds in the present kind of cleaning agents, and then to use these cleaning agents at room temperature. Accordingly, an important energy saving is attained in this way which is not at the expense of the cleaning action.

Accordingly, this invention relates to cleaning agents on the basis of active chlorine and alkali which are characterized by the fact that they also contain a minor amount of a compound of the formula

$$C_8H_{17}O-(C_2H_4O)_nCH_2COOM,$$

wherein M is sodium or potassium and n is a number having an average value of 1 - 10.

The present surfactants are known per se and belong to a group of compounds which is already known for a long time for its useful properties. However, within this group of compounds the C_8H_{17}-compounds have always been considered to constitute more or less a borderline case, and compounds derived from larger hydrophobic residues were always preferred. This appears not only from the above-mentioned UK-A-2,076,010 which, although stating that the hydrophobic residue may be a.o. a C_{6-20} alkyl residue, states a preference for C_{12}-C_{13}, and from EU-A-0,072,600 which mentions as hydrophobic group a.o. an alkyl group of 8 - 18 carbon atoms and expresses a clear preference for C_{12}-C_{14}, but also from NL-A-7405231, wherein the hydrophobic residue again may be a C_8-C_{20}

alkyl group, but again is preferably C_{12}-C_{14} alkyl, and from FR-A-1,099,847 which, although mentioning the C_8H_{17} compound as an example of a possible compound, also clearly prefers higher alkyl compounds. It should be noted that the C_8 compound is used in none of the examples of the above-mentioned publications.

In the compounds used according to the present invention the alkyl group C_8H_{17} may be a straight chain or branched group, for instance n-octyl or 2-ethylhexyl. In principle one can of course also incorporate the free acid into the composition containing the active chlorine and alkali, so that the desired salt is formed in situ. Theoretically it is of course also possible to use other salts, such as the ammonium salt or organic ammonium and amine salts, but of course in actual practice one uses preferably a salt of the ethercarboxylic acid with the same anion as in the alkali metal hydroxide component of the base mixture.

The other components in the system are the usual ones for this kind of compositions. The alkali is KOH or NaOH and the concentration thereof can be varied within relatively wide limits, generally between 20 to 250 g per liter. A suitable concentration is in the order of 80 - 120 g per liter. The active chlorine in the system can be derived from various usual compounds. Chlorine-containing bleaching lye is a cheap product, and therefore this is generally used. However, a compound like trichlorocyanuric acid or chloramine T can also be used as chlorine-producing agents. Usually, the system contains about 3 - 6 % of active chlorine, preferably about 4.5 %. As mentioned already, the amount of alkali in such systems is at least 50 % of the amount of bleaching agent.

The amount of surfactant to be used according to the present invention can best be expressed in the weight ratio between surfactant and active chlorine. This weight ratio generally can vary from 1:10 to 1:3. Thus it is suitable to use 0.65 % of the present surfactant with the above-mentioned preferred amount of 4.5 % of active chlorine.

EXAMPLES

A number of mixtures were prepared, containing 30.0 % hypochlorite bleaching agent (150 g chlorine/liter), 20.0 % of 50 % aqueous potassium hydroxide, the percentages of ethercarboxylic potassium salts stated herein-below, and the remainder water. The used ethercarboxylic salts had the formula octyl-O-$(C_2H_4)_n$-CH_2COOK.

Example	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
% n = 3	0.5	1	0.75	0.5	0.5	0.25	0.4	-	-	0.25	-
% n = 5	-	-	0.75	0.5	-	0.5	0.4	-	-	0.25	0.65
% n = 8	1	0.5	-	-	0.25	-	-	0.60	0.65	0.25	-

A foaming test was carried out by dissolving 10 grams of each product in 1 liter of tap water (German hardness about 20°), shaking 50 ml of this solution vigorously by hand in a shaking cylinder of 100 ml, and reading the foam volume after 1 minute. In this experiment a foam volume of 15 ml or less is considered satisfactory. The results of these experiments have been rendered in the following table.

Example	Temperature, °C	ml of Foam
I	20	10
II	20	12
III	20	13
IV	20	12
V	15	8
VI	15	9
VII	13	6
VIII	13	7
IX	12	9
	13	7
	14	9
	19	5
	20	6
X	13	13
XI	12	9
	20	7

For some purposes KOH is preferred in this kind of compositions and for other purposes NaOH is preferred. This does not make any difference for the effect of the present invention, as will appear from the following two examples.

The mixtures of Examples IX and XI were prepared again, but this time with NaOH. These compositions are named Examples IXa and XIa. They were also subjected to the above foaming test, and this at 12°C and 20°C. The results have been rendered hereinbelow, and for the sake of clarity the corresponding results with KOH from the above table have been reiterated here.

Example	ml of Foam at 12°C	ml of Foam at 20°C
IX	9	6
IXa	10	7
XI	10	7
XIa	11	6

WHAT IS CLAIMED IS:

1. A cleaning agent based on active chlorine providing bleaching agent and alkali metal hydroxide in an amount of at least 50 % of the bleaching agent, characterized by containing a minor amount of a low-foaming compound of the formula $C_8H_{17}O-(C_2H_4O)_nCH_2COOM$, wherein M is sodium or potassium and n is a number having an average value of 1 - 10.

2. A cleaning agent according to claim 1, characterized by the fact that the weight ratio between said low-foaming compound and active chlorine is 1:10 to 1:3.

3. A cleaning agent according to claim 1 or 2, characterized by the fact that it contains 3 - 6 % of active chlorine in the form of bleaching lye.