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(54) **Acidic liquid cleaning composition.**

(57) An acidic, aqueous liquid detergent composition, especially suitable for toilet bowl cleaning, is provided with a colour-change ingredient to enable the user to monitor the concentration of the composition upon dilution with water when using the product.

By including a detergent-active compound which exists in cationic form in the acid composition and a dye which undergoes a pH-dependent colour change in the acid pH range, the required colour change indication is obtained.

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Description

"ACIDIC LIQUID CLEANING COMPOSITION"

The present invention relates to aqueous, acidic liquid cleaning compositions which are suitable for cleaning hard, acid-resistant surfaces such as metallic, vitreous and ceramic surfaces. They are especially suitable for cleaning toilet bowls.

Acidic liquid toilet bowl cleaning compositions are well known in the art. They usually consist of an aqueous solution of a strong acid, to which various desirable additives have been added, such as detergent-active compounds, germicides, perfumes, corrosion inhibitors, colouring agents and so on. As detergent-active compounds anionic, nonionic and cationic detergents have been suggested for inclusion in such acidic liquid toilet bowl cleaning compositions. When desired, a pleasing colour is imparted to such compositions by adding a suitable dye, such as a blue dye. Such compositions are particularly effective in removing toilet scale deposits, derived from the water supply to the toilet.

In order to enable the user of these compositions to monitor the concentration of such products in the water upon dilution when using these products, it would be desirable to include an ingredient giving the user a readily appreciated rating of the concentration present. Such an ingredient would be a pH indicator, the colour of which changes upon dilution, as is for instance suggested for liquid detergents in GB Patent Specification 1 313 180.

However, we have found that the performance of such a colour change providing ingredient in acidic toilet bowl cleaners is related to the nature of the detergent-active compound present in the compositions, and that such a colour change is only obtained if the composition contains a detergent-active compound that exists in a cationic form under the acidic conditions of the composition. Cationic surfactants are particularly advantageous in acidic toilet cleaning compositions because of their known germicidal properties.

Consequently, the present invention in its broadest aspects relates to an aqueous, acidic liquid cleaning composition comprising an aqueous solution of a strong acid, a detergent-active compound and a dye, which is characterised by the fact that the detergent-active compound exists in a cationic form in the composition and that the dye undergoes a pH-dependent colour change in the acid pH range.

Detergent-active compounds which are cationic under the acidic conditions in the composition are e.g. permanent cationics such as the quaternary ammonium and imidazoline compounds, or tertiary amines, tertiary amine oxides, amine ethoxylates, betaines and sulphobetaines. Specific examples are coconut dimethyl amine oxide, coconut trimethyl quaternary ammonium chloride, coconut sulphobetaine.

In general, the compositions contain the cationic detergent-active compound in an amount of 0.1-10% by weight. Mixtures of several cationic detergents, as well as of a cationic and a nonionic detergent may also be used.

The dyestuffs suitable for use according to the present invention are those which undergo a pH-dependent colour change in the acid pH range, i.e. for the present invention in the range of 2-6 in aqueous solution.

Typical examples of such dyestuffs are the triarylmethane types such as Acid Blue 1 (CI 42045), Acid Blue 9 (CI 42090), Acid Violet 17 (CI 42650) and Mordant Blue 1 (CI 43830). In general, the compositions contain from 0.0001-1% by weight of the dyestuff. Optionally, other dyestuffs which do not undergo a pH-dependent colour change may additionally be included so as to achieve a change to a desired colour.

As strong acid, inorganic acids such as hydrochloric acid, sulphuric acid, nitric acid and sulphamic acid are suitable; the compositions contain the acid in an amount of 0.5-25% by weight. The pH of the compositions of the present invention is below 2, and in most useful cases below 1.

Other optional ingredients may also be included, such as perfumes, corrosion inhibitors, viscosity modifiers, electrolyte salts, small amounts of anionic detergents, solvents, hydrotropes etc. Thickened compositions are especially desirable since they remain in contact with vertical and inclined surfaces of the toilet for a longer period of time and give improved cleaning. The compositions of the invention can be thickened by surfactants, by polymeric materials such as xanthan gums, polyacrylates and by inorganic thickeners such as silicas and clays.

Examples 1-13

The following table shows a number of compositions of the present invention which undergo colour change upon dilution with water. The figures are percentages by weight.

Example	1	2	3	4	5	6	7	8	9	10	11	12	13
Hydrochloric acid	8	10	15	-	-	8	8	10	10	10	10	10	10
Sulphuric acid	-	-	-	10	-	-	-	-	-	-	-	-	-
Sulphamic acid	-	-	-	-	10	-	-	-	-	-	-	-	-
Coco-dimethylamine oxide	3.5	3.5	3.5	4.0	4.0	1.0	2.5	4.0	4.0	4.0	-	-	-
Coco-trimethyl ammonium chloride	-	-	-	-	-	-	-	-	-	-	2.0	-	-
Coco-sulphobetaine	-	-	-	-	-	-	-	-	-	-	-	3.0	-
Tallow amine ethoxylate (10EO)	-	-	-	-	-	-	-	-	-	-	-	-	3.0
C_{14}-C_{15} alcohol ethoxylate (18EO)	-	-	-	-	-	-	2.5	-	-	-	-	-	-
Xanthan gum	-	-	-	-	-	0.3	-	-	-	-	-	-	-
Acid stable perfume	0.2	0.2	0.2	0.2	0.2	-	0.2	0.2	0.2	0.2	0.1	0.2	0.15
Acid Blue 1 (CI 42045)	0.005	0.005	0.003	0.005	0.004	0.005	0.005	-	-	-	0.004	0.005	0.005
Acid Blue 9 (CI 42090)	-	-	-	-	-	-	-	0.004	-	-	-	-	-
Acid Violet 17 (CI 42650)	-	-	-	-	-	-	-	-	0.007	-	-	-	-
Mordant Blue 1 (CI 43830)	-	-	-	-	-	-	-	-	-	0.005	-	-	-
Colour change neat	lg	y	y	y	t	lg	lg	g	c	o	g	lg	y
dilute	b	b	b	b	b	b	b	b	p	p	b	b	b

KEY: lg = lime green
y = yellow
t = turquoise
g = green
b = blue
p = pink
c = colourless
o = orange

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Claims

1. An acidic, aqueous liquid cleaning composition having a pH of below 2, comprising an aqueous solution of a strong acid, a detergent-active compound and a dye which undergoes a pH-dependent colour change, characterised in that the detergent-active compound exists in a cationic form in the composition and the dye undergoes a pH-dependent colour change in the acid pH range.

2. A composition according to claim 1, characterised in that the detergent-active compound is a permanent cationic detergent-active compound selected from the group consisting of the quaternary ammonium and imidazoline compounds.

3. A composition according to claim 1, characterised in that the detergent-active compound is only cationic in the acid pH range, selected from the group consisting of tertiary amines, tertiary amine oxides, ethoxylated amines, betaines and sulphobetaines.

4. A composition according to claims 1-3, characterised in that it is thickened by inclusion therein of a thickening agent.