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(54) **Title**: HARD SURFACE CLEANING COMPOSITION CONTAINING SURFACTANT AND ALKALINE BUILDER

(57) **Abstract**: A bleach-free powder composition comprising: (i) 1 to 5 wt% non-soap anionic surfactant; and, (ii) a non-phosphate builder having Reserve Alkalinity less than 40 ml of 0.1 N HCl in 1% aqueous solution; and, (iii) a first abrasive having Mohs Index of 3 to 5 and a second abrasive having Mohs Index of 5.5 to 7, collectively amounting to 15 to 70 wt% of said composition, wherein ratio of said surfactant to said builder is 1:0.5 to 1:25. A method of antibacterial cleaning of toilets to bring at least 2- log reduction in viable count of gram positive and gram negative bacteria, said method comprising: (i) contacting said surface with the said composition for at least ten minutes; (ii) washing said surface with water.



HARD SURFACE CLEANING COMPOSITION CONTAINING SURFACTANT AND ALKALINE BUILDER

Field of the invention

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The invention relates to a composition for cleaning hard surfaces, more particularly for rendering toilet bowls more hygienic by controlling bacterial growth.

Background of the invention

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A wide range of compositions is available for cleaning inanimate hard surfaces. Such surfaces would include bathrooms, toilet bowls and kitchens, which are made of a variety of hard materials such as enamel, ceramic, and porcelain.

15 The types of stains usually encountered in lavatories, toilets and bathrooms include lime scale deposits, soap scum and organic soil. In addition to this, there is significant growth of bacteria in and around toilet bowls.

20 Compositions that are commercially available for cleaning toilets include acidic cleaners, phenyl and bleach-based cleaners. Some high-end toilet cleaning compositions include gels and pastes.

Acidic compositions are particularly effective against lime scale. Bleach-based compositions are effective against stains. However, these compositions are harsh.

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WO09085049 A1 (Colgate-Palmolive) discloses a cleaning composition containing an organic acid, an ethoxylated alcohol and a hydrophilic polymer that adsorbs onto hard surfaces.

30 US2009197786 A (Reckitt Benckiser) discloses hard surface cleaning compositions particularly adapted to clean toilets. The compositions are aqueous, thickened, acidic compositions having acid, a thickening constituent, a deterative surfactant and at least one

super-wetter surfactant based on a narrow range ethoxylated alcohol nonionic surfactant having two cloud points.

WO12049202A1 (Corbellini) discloses a powdery cleaning agent containing at least one
5 acid, at least one water-soluble carbonate and at least one biocide for cleaning
flush toilets and washing machines.

US6387868B (Uno Shoyu Co. Ltd, 2002) discloses clear aqueous liquid detergents
containing an alkyl benzene sulfonate surfactant, liquid sodium silicate, a polyoxyethylene
10 alkyl or aryl ether nonionic surfactant and an alkyl ether sulfate surfactant. The silicate
boosts detergency. This composition is a fabric washing composition, which is dilutable
and dissolves in water without becoming cloudy over long period. The presence of
nonionic and anionic surfactants provide stability. The pH of these compositions is about 7
to 8.

15 EP0379093A1 (Sterling Drug Inc, 1990) discloses highly alkaline, yet non-corrosive,
aqueous hard surface cleaning compositions for cleaning industrial and kitchen surfaces
soiled with burnt-on grease and other organic soils. Combination of alkanolamine to
metasilicate in critical ratios along with certain other essential ingredients provide the
20 desired technical effect.

In some parts of the world, people use proxy products to clean their toilets. Such proxy
products include low-priced detergent powders. Alternatively, some do use bleaching
powders, acids, phenyls or even leftover detergent wash-liquor. While such products
25 do provide some degree of cleaning, they are not prepared to cater to such secondary
uses. Therefore, users of such products get sub-optimal cleaning in spite of significant
efforts and inconvenience. Further, the users are at risk of exposing themselves to, or
coming in contact with human waste, and variety of pathogenic microbes, mainly Gram
Positive and Gram Negative bacteria that thrive under unhygienic conditions.

30 In the absence of proper communication and knowledge of appropriate consumer
products, such consumers may remain under the misbelief of clean, hygienic and
germ-free toilets.

Therefore, there is need for compositions, which are capable of acting against Gram Positive as well as Gram Negative bacteria within a reasonable time e.g., 10 to 30 minutes of application, without the need to alter the habits of such consumers. The compositions should be bleach-free so that consumer-awareness and product literacy
5 need not become a concern for new users. Further, such products need to be sustainable, utilising less of non-renewable resources like synthetic surfactants.

Romanian patent RO116484 discloses a cleaning powder comprising 70 to 90 % by weight ground dolomite, 1 to 5 % by weight soda ash, 1 to 5% sodium
10 tripolyphosphate, and 1 to 5% straight chain sodium salt of alkyl benzene sulfonic acid. The cleaning powder provides stain-free cleaning and is not harsh to human skin.

An abrasive cleaning formulation disclosed in Modern Chemical Specialties (Mac Nair-Dorland Company, 1950) contains 5 % by weight coconut oil soap, 2.5 % by weight
15 sodium silicate, 3.5 % by weight soda ash and 85 % by weight abrasives.

However, these formulations are effective against either Gram Positive bacteria or Gram Negative bacteria but not necessarily both. Hard surface cleaning compositions, and especially toilet cleaning compositions, should be effective against either form of
20 bacteria and at the same time adequately remove soil.

Summary of the invention

We have determined that a solution lies in compositions in accordance with this
25 invention. The compositions in accordance with this invention are significantly more effective against Gram Positive as well as Gram Negative bacterium and removal of soil.

In accordance with a first aspect is disclosed a bleach-free powder composition for
30 cleaning hard surfaces, said composition comprising:

- (i) 1 to 5 % by weight non-soap anionic surfactant; and,
- (ii) a non-phosphate builder having Reserve Alkalinity less than 40 ml of 0.1 N HCl in 1% aqueous solution; and,

- (iii) a first abrasive having Mohs Index of 3 to 5 and a second abrasive having Mohs Index of 5.5 to 7, collectively amounting to 15 to 70 % by weight of said composition,

wherein ratio between amount of said surfactant to that of said builder is 1:0.5 to 1:25.

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The invention and all other aspects thereof will be explained in details.

Detailed description of the invention

- 10 In the description, the term % by weight denotes the percentage by weight of the composition. For example, the total surfactant content of compositions in accordance with this invention is 1 to 5 % by weight, which means that 100 g of a composition contain 1 to 5 g surfactant.
- 15 The term inanimate hard surfaces includes surfaces which are particularly prone to bacterial growth such as floors, walls, tiles, sinks, shower plastified curtains, wash basins, bidets and toilet bowls of Western or Indian-style toilets. On the other hand animate hard surfaces include teeth.
- 20 Although the compositions in accordance with this invention are useful for toilet cleaning, the compositions could be used to clean any other inanimate hard surface.

- Many people around the world face the problem of unhygienic toilets. It mostly applies to the developing and the least developed countries. Toilet bowls and the adjacent area is
- 25 prone to bacterial growth. Proxy cleaning products are unable to control their growth. Therefore, the bacteria multiply quickly. Most bacteria that thrive under such conditions are pathogenic.

- High-priced products may provide up to 5-log reduction in the viable bacterial count when
- 30 tested according to European Suspension Test *BS EN 1276*. However, it is an arduous task to provide such a high level of hygiene, unless the compositions contain significant amount of acid, bleach, antibacterial agents and other active ingredients.

Research indicates that at least 2-log reduction, i.e., 99 % reduction in viable count of bacteria, especially the pathogenic ones, is necessary for minimal hygiene. Gram-positive and Gram-negative bacteria thrive under unhygienic conditions. *S.aureus* and *E.hirae* are the most common Gram Positive bacteria whereas *P.aeruginosa* and *E.coli* are the most common Gram Negative type. A product of this nature is considered efficacious if it brings about at least 2-log reduction in the viable count of at least one Gram Positive bacteria and at least one Gram Negative bacteria within reasonable time e.g., 10 to 30 minutes. This is broad-spectrum antibacterial activity.

Accordingly, the compositions in accordance with this invention, on contact with an inanimate hard surface comprising thereon at least one Gram positive bacteria selected from *S.aureus* and *E.hirae* and at least one Gram Negative bacteria selected from *P.aeruginosa* and *E.coli*; provide, in accordance with BS EN 1276 protocol, at least 2-log reduction in viable count of at least one of the Gram positive bacteria and at least one of the Gram negative bacteria.

Compositions in accordance with preferred aspect of this invention provide at least 5-log reduction in the viable count of at least one of each kind when tested according to European Suspension Test *BS EN 1276*. The EN 1276 Standard describes a quantitative suspension test for the assessment of the bactericidal activity of chemical antiseptics and disinfectants. This test method evaluates how effectively a product causes reduction in number of viable bacterial cells of the relevant test microorganisms.

Consumers prefer hard surface cleaning powders, which are easy to handle and apply. However, some of the expensive detergent compositions contain significant amount of surfactants and it would make little sense to use such expensive products to clean toilets. However, formulating a non-bleach, non-acidic hard surface cleaning composition is a technical problem, especially if the products need to be sustainable and provide at least 2-log reduction in viable bacterial count of at least one Gram Positive bacteria and at least one Gram Negative bacteria.

The compositions in accordance with the invention are bleach-free.

By bleach-free is meant that the compositions comprise (cumulatively) less than 1 % by weight conventional bleaching ingredients. Such ingredients include hypochlorites, sulphites, bisulphites, metabisulphites, isocyanurates, persulphates, percarbonates, peroxides, perborates and other bleach ingredients.

5

Further, it is preferred that the compositions in accordance with this invention comprise not more than 3 % by weight moisture, as moisture may affect stability.

Non-soap Anionic Surfactant

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The compositions in accordance with this invention comprise 1 to 5 % by weight non-soap anionic surfactant. The total amount is significantly less than that of conventional products, therefore the composition contributes to sustainability by being lesser reliant on non-renewable resources.

15

The term non-soap anionic surfactant is well-known in the field of detergents and cleaning products. This term is used to distinguish non-soap anionic surfactants from their counterpart surfactants based on soaps, i.e., alkali metal salts of fatty carboxylic acids.

20 The non-soap anionic surfactant provides basic cleaning action. It is preferred that the non-soap anionic surfactant is at least one of linear alkyl benzene sulphonate, an alkoxyated primary alcohol sulphate, a non-alkoxyated primary alcohol sulphate, an olefin sulphonate, an ester sulphonate or a secondary alcohol sulphate.

25 It is particularly preferred that the non-soap anionic surfactant is non-alkoxyated surfactant, preferably a linear alkyl benzene sulphonate, preferably having carbon chain length of C₈₋₂₀. Generally the counter ion for anionic surfactants is an alkali metal, typically sodium, although instead of alkali metals, other amine based counter ions can also be present. Preferred linear alkyl benzene sulphonate surfactants include sodium
30 salt of linear alkyl benzene sulphonates with an alkyl chain length of from 8 to 15, more preferably 12 to 14.

- Alternatively, but less preferably, the anionic surfactant is an alkoxyated primary alcohol sulphate, generally represented by the formula $\text{RO}(\text{C}_2\text{H}_4\text{O})_x\text{SO}_3^-\text{M}^+$ where R is an alkyl chain having from 10 to 22 carbon atoms, saturated or unsaturated, M is a cation which makes the compound water-soluble, especially an alkali metal, ammonium or substituted ammonium cation, and x averages from 1 to 15. Preferably R is an alkyl chain having from 12 to 16 carbon atoms, M is sodium and x averages from 1 to 9, preferably x is 1 to 7. It is particularly preferred that the alkoxyated anionic surfactant is sodium lauryl ether sulphate (SLES). It is the sodium salt of lauryl ether sulphonic acid in which the predominantly C_{12} lauryl group ethoxylated with an average of 1 to 5 moles of ethylene oxide units per mole. The non-alkoxyated primary alcohol sulphates are devoid of any alkoxyated groups. An example is sodium lauryl sulphate. It is particularly preferred that the non-soap anionic surfactant is linear alkyl benzene sulphonate.
- Alternatively, other suitable non-soap anionic surfactants, useful in the compositions in accordance with this invention are water-soluble alkali metal salts of organic sulphates having alkyl radicals containing from about 8 to about 22 carbon atoms, the term alkyl being used to include the alkyl portion of higher acyl radicals. Examples include sodium and potassium alkyl sulphates, especially those obtained by sulphating higher C_8 to C_{18} alcohols, produced for example from tallow or coconut oil, sodium alkyl glyceryl ether sulphates, especially those ethers of the higher alcohols derived from tallow or coconut oil and synthetic alcohols derived from petroleum, ester sulphonates and the alpha-olefin sulphonates.
- Reference may be made to the surfactants described in "Surface Active Agents" Vol. 1, by Schwartz & Perry, Interscience 1949, Vol. 2 by Schwartz, Perry & Berch, Interscience 1958, in the current edition of "McCutcheon's Emulsifiers and Detergents" published by Manufacturing Confectioners Company or in "Tenside-Taschenbuch", H. Stache, 2nd Edn., Carl Hauser Verlag, 1981.
- It is particularly preferred that compositions in accordance with the invention comprises, cumulatively, less than 1 % by weight of surfactants, other than said non-soap anionic surfactant. Such surfactants include soap, non-ionic, cationic and zwitterionic

surfactants. This is to prevent, or at least reduce to the extent possible, any unwanted interaction with other ingredients.

Non-phosphate builder

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Compositions in accordance with this invention comprise a non-phosphate builder whose Reserve Alkalinity is less than 40 ml of 0.1 N HCl in 1% aqueous solution. It is preferred that compositions in accordance with the invention comprise 1 to 15 % by weight of said builder. It is preferred that the non-phosphate builder is at least one of
10 sodium hydroxide or sodium carbonate.

Persons skilled in the art of home care compositions, especially laundry and hard surface cleaning compositions are familiar with the meaning of the term Reserve Alkalinity. It is the amount of acid required to lower the pH to a chosen value, i.e. down
15 to pH 8.

Without wishing to be bound by theory, it is believed that combination of the surfactant and the builder acts synergistically against Gram Positive and Gram Negative bacteria. Compositions comprising either one of them are not as effective.
20

The ratio between amount of the surfactant to that of the builder is 1:0.5 to 1:25. Further, preferably it is in the range of 1:1 to 1:15. It is observed that beyond the range, the compositions are not as effective.

25 Further, it is preferred that amount of non-phosphate builder having Reserve Alkalinity more than 40 ml of 0.1 N HCl is less than 1 % by weight. Such builders include sodium aluminate, sodium disilicate, sodium silicate and sodium metasilicate.

Abrasives

30

Mohs Index was developed for minerals to classify according to their hardness, from 1 (the softest) to 10 (the hardest) and has been used by mineralogists since its inception.

It is preferred that the abrasive having Mohs Index of 3 or more is at least one of calcite, dolomite, sodium sulphate, feldspar, apatite, fluorite, hematite, kyanite, magnetite, orthoclase or pumice. It is particularly preferred that the abrasive is a combination of calcite and dolomite. The abrasive may form, and preferably does form, a large portion of
5 the balance of the compositions in accordance with this invention.

The compositions in accordance with this invention comprise two different abrasives, differing in their abrasive index. The compositions comprise a first abrasive having Mohs Index of 3 to 5 and a second abrasive having Mohs Index of 5.5 to 7, collectively
10 amounting to 15 to 70 % by weight of the composition. It is further preferred that the ratio of the amount of the first abrasive having Mohs Index of 3 to 5 to that of the a second abrasive having Mohs Index of 5.5 to 7 is in the range of 1:0.3 to 1:0.6. It is preferred that the first abrasive is dolomite (Mohs Index 3.5 to 4) and the second abrasive is feldspar (Mohs Index 6 to 6.5).

15 Further preferably, the amount of the first abrasive is 40 to 60 % by weight of the composition. Yet further preferably the amount of the second abrasive is 15 to 30 % by weight of the composition.

20 Salt

It is preferred that the compositions in accordance with this invention comprise an inorganic salt selected from sodium chloride, potassium chloride, sodium sulphate or potassium sulphate. It is more preferred that the salt is sodium chloride or sodium
25 sulphate. When present, it is preferred that the amount of the salt is 5 to 15 % by weight of the composition.

Use and method in accordance with the invention

30 In accordance with another aspect is disclosed use of a composition as claimed in claim 1 as an antibacterial toilet cleaner. It is preferred that the composition provides in accordance with *BS EN 1276 protocol*, at least 2-log reduction in viable count of at least one Gram positive bacteria selected from *S.aureus* and *E.hirae* and at least one Gram

negative bacteria selected from *P.aeruginosa* and *E.coli*. It is further preferred that after application, said composition is allowed contact time of at least 10 to 30 minutes. In case of using the composition for cleaning toilet bowls, the said composition can be applied to the surface and spread effectively with the help of a scrubber, left for few minutes,
5 e.g., 10 to 30 minutes, and then washed with water.

In case of using the composition for cleaning toilet bowls, the said composition can be applied to the surface and spread effectively with the help of a scrubber, left for few minutes, e.g., 10 to 30 minutes,, and then rinsed with water.

10

In accordance with yet another aspect is disclosed a composition of the first aspect wherein on contact with an inanimate hard surface comprising thereon at least one Gram positive bacteria selected from *S.aureus* and *E.hirae* and at least one Gram Negative bacteria selected from *P.aeruginosa* and *E.coli*, said composition provides, in accordance
15 with *BS EN 1276* protocol, at least 2-log reduction in viable count of at least one of said Gram positive bacteria and at least one of said Gram negative bacteria.

In another aspect the invention provides a method of cleaning an inanimate hard surface comprising thereon at least one Gram positive bacteria selected from *S.aureus* and
20 *E.hirae* and at least one Gram Negative bacteria selected from *P.aeruginosa* and *E.coli* to bring about at least 2-log reduction in viable count of at least one of said Gram positive bacteria and at least one of said Gram negative bacteria in accordance with *BS EN 1276* protocol, said method comprising:

- (i) a step of contacting said surface with a composition in accordance with a
25 first aspect of the invention for at least ten minutes; followed by,
- (ii) washing said surface with water.

Preferably, the contact is for 15 to 30 minutes.

Compositions in accordance with the invention bring about at least 80 % reduction in toilet
30 malodour when tested with a model malodour mix containing cresols, glycol, dimethyl disulfide and n-methyl morpholine in propylene glycol solvent. The test involves addition of the malodor mix in a container, contact with the composition for 30 minutes, followed by

analysis using GCMS. The test method evaluates how effectively a product causes reduction in headspace malodor.

Optional ingredients:

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The compositions of the invention may optionally comprise other ingredients, such as fragrance, colorant, foam boosting agents, odour absorbing materials, preservatives (e.g. bactericides), pH buffering agents, anti-oxidants and anti-corrosion agents.

Further, optionally, but preferably, the compositions in accordance with this invention
10 comprise a colour-change system, which preferably comprises granular encapsulates comprising colouring agent such as a dye or pigment, which releases its colour on contact with water, which happens in-use.

Packaging

15 The composition according to the invention could be packed in any suitable container. Preferably, the compositions are packaged in an air-tight plastic bottle with a detachable closure /pouring spout. The bottle may be rigid or deformable. Preferably, the container is clear enough so that visual cues, like the colour changing actives, if any, are visible from outside. The bottle may be provided with one or more labels, or
20 with a shrink sleeve which is desirably at least partially transparent, for example 50 % of the area of the sleeve is transparent. The adhesive used for any transparent label should preferably not adversely affect transparency.

The invention will now be described with reference to the following non-limiting examples.

25 **Examples**

Example 1: Comparative Examples with Compositions outside the Invention

For the purpose of comparative analysis, some compositions outside the invention were prepared as tested. Details thereof are included in Table 1.

30

Table 1

Ingredient/% by weight	Composition No.	
	1	2
Na-LAS	8.0	0.5
Soda ash	25.0	15.0
Dolomite	32.0	49.5
Feldspar	25.0	25.0
Sodium sulphate	10.0	10.0

- 5 Experiments were conducted in order to determine the efficacy of each composition of Table 1 against one Gram Positive bacteria (*S.aureus*) and one Gram Negative bacteria (*P.aureginosa*). The efficacy was determined in terms of reduction in the viable bacterial count brought about by the compositions after contact time of 15 minutes and 30 minutes.

10

Procedure:

The concerned test bacterium was grown overnight at 37 °C on a TSA (Tryptic Soya Agar) plate. The grown culture colonies were suspended again in tryptone diluent.

- 15 Density of the culture was adjusted to get final count of $1.5-5.0 \times 10^8$ cfu/ml based on McFarland standards (McFarland 1.5 measured using bioMérieux Densomat®).

Thereafter 240 µl of the test solution was placed into test wells in a micro-titre plate. Equal volumes of test culture and bovine serum albumin (interfering substance) were combined for two minutes, before 60 µl of the mixture being added to the test solution.

- 20 After a contact time of five minutes, 30 µl of the mixture was mixed with a neutralising solution. This solution was then serially diluted in tryptone soya broth and then spot-plated onto TSA plates. After absorption, the plates were incubated at 37 °C for 24 hours and the residual colonies were counted. All the experiments were done under aseptic conditions and all media were autoclaved at 15 psi pressure before use. The
- 25 extent of reduction in bacterial count was calculated by taking into account the difference between initial and final cfu/ml values.

The observations are summarised in Table 2.

Table 2

Bacteria Composition	Time/minutes	Composition No.	
		1	2
Log reduction/ <i>S.aureus</i>	30	>5	<1
Log reduction/ <i>P.aeruginosa</i>	30	<1	>5

- 5 The data set out in Table 2 clearly indicates that none of the comparative compositions causes at least 2-log reduction in the viable count of the Gram Positive as well as the Gram Negative bacteria.

Example 2: Compositions in accordance with prior art

10

Comparative examples A and B (based on Romanian patent RO116484) were tested for efficacy against *S. aureus* and *P. aeruginosa*.

Table 3

Ingredient/% by weight	Comparative Example	
	A	B
Na-LAS	4	1.5
Soda ash	3	5
Sodium triphosphate	3	5
Dolomite	90	88.5
Feldspar	-	-
Sodium sulphate	-	-

15

Table 4

	Time/minutes	Composition No.	
		A	B
Log reduction/ <i>S.aureus</i>	15	>5	>5
Log reduction/ <i>P.aeruginosa</i>	15	>5	>5

Example 3: Compositions inside the invention

20

Three compositions within the scope of the invention were tested as described earlier. The compositions are shown in Table 5 and the observations (recorded at the end of 30 minutes) are shown in Table 6.

Table 5

5

Composition No.	Na-LAS (% by weight)	Sodium carbonate (% by weight)	Ratio	Feldspar (% by weight)	Sodium sulphate (% by weight)	Dolomite (% by weight)
3	2	5	1:2.5	25	10	58
4	2	10	1:5	25	10	53
5	1	5	1:5	25	10	59
6	2	15	1:7.5	25	10	48
7	1	10	1:10	25	10	54

Table 6

Bacteria	Composition				
	3	4	5	6	7
Log reduction/ <i>S.aureus</i>	5.0	5.0	5.0	5.0	5.0
Log reduction/ <i>P.aureginosa</i>	5.0	5.0	5.0	5.0	5.0

10

The data in table 6 indicates that each composition led to significantly more than 2-log reduction in viable count of Gram Positive as well as Gram Negative bacteria

Example 4: Model bathroom soil removal

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Comparative Examples A, B and C and Composition no. 8 were tested for efficacy of bathroom soil.

20 A model bathroom soil composition containing calcium stearate was sprayed on enamel tiles for uniform deposition and then baked at a certain temperature for a fixed amount of time.

25 5g of the composition was spread on the model bathroom soil uniformly. A pressure of 340 g/cm² was applied on the soil through a head, covered with a cloth as an implement. The soiled plate was then scrubbed in a cleaning equipment for fixed

rotations. After cleaning, the tile was rinsed under running water. The tile was weighed after drying and the % soil removal was calculated gravimetrically.

Table 7

5

Ingredient/% by weight	C	Composition No. 8
Na-LAS	2	5
Soda ash	15	10
Sodium triphosphate	-	-
Dolomite	48	40
Feldspar	25	30
Sodium sulphate	10	15

Table 8

	Model bathroom soil removal (%)
A	74
B	74
C	80
8	90

10

Claims

1. A bleach-free powder composition for cleaning hard surfaces, said composition comprising:
 - (i) 1 to 5 % by weight non-soap anionic surfactant; and,
 - (ii) a non-phosphate builder having Reserve Alkalinity less than 40 ml of 0.1 N HCl in 1% aqueous solution; and,
 - (iii) a first abrasive having Mohs Index of 3 to 5 and a second abrasive having Mohs Index of 5.5 to 7, collectively amounting to 15 to 70 % by weight of said composition,wherein ratio between amount of said surfactant to that of said builder is 1:0.5 to 1:25.
2. A composition as claimed in claim 1 wherein said non-phosphate builder is at least one of sodium hydroxide or sodium carbonate.
3. A composition as claimed in claim 1 or 2 wherein said anionic surfactant is non-alkoxylated surfactant.
4. A composition as claimed in claim 3 wherein said non-alkoxylated anionic surfactant is a linear alkyl benzene sulphonate.
5. A composition as claimed in any one of claims 1 to 4 wherein amount of said builder is 1 to 15 % by weight of the composition.
6. A composition as claimed in any one of claims 1 to 5 wherein said abrasive is at least one of calcite, dolomite, feldspar, apatite, fluorite, hematite, kyanite, magnetite, orthoclase or pumice.
7. A composition as claimed in any one of claims 1 to 6 wherein ratio of the amount of said first abrasive having Mohs Index of 3 to 5 to that of said a second abrasive having Mohs Index of 5.5 to 7 is in the range of 1:0.3 to 1:0.6.

8. A composition as claimed in any one of claims 1 to 7 wherein said composition further comprises an inorganic salt selected from sodium chloride, potassium chloride, sodium sulphate or potassium sulphate.
9. A composition as claimed in any one of claims 1 to 8 wherein said composition comprises, cumulatively, less than 1 % by weight surfactant, other than said non-soap anionic surfactant.
10. A composition as claimed in any one of claims 1 to 9 wherein amount of non-phosphate builder having Reserve Alkalinity more than 40 ml of 0.1 N HCl is less than 1 % by weight.
11. A method of cleaning an inanimate hard surface comprising thereon at least one Gram positive bacteria selected from *S.aureus* and *E.hirae* and at least one Gram Negative bacteria selected from *P.aeruginosa* and *E.coli* to bring about at least 2-log reduction in viable count of at least one of said Gram positive bacteria and at least one of said Gram negative bacteria in accordance with *BS EN 1276* protocol, said method comprising:
 - (i) a step of contacting said surface with a composition as claimed in any one of claims 1 to 10 for at least ten minutes; followed by,
 - (ii) washing said surface with water.
12. A composition as claimed in any one of claims 1 to 10 wherein on contact with an inanimate hard surface comprising thereon at least one Gram positive bacteria selected from *S.aureus* and *E.hirae* and at least one Gram Negative bacteria selected from *P.aeruginosa* and *E.coli*; said composition provides, in accordance with *BS EN 1276* protocol, at least 2-log reduction in viable count of at least one of said Gram positive bacteria and at least one of said Gram negative bacteria.
13. Use of a composition as claimed in any one of claims 1 to 10 as an antibacterial toilet cleaner.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/060990

A. CLASSIFICATION OF SUBJECT MATTER

INV. C11D1/22 C11D3/04 C11D3/10 C11D3/14 C11D3/48
A01N25/30 A01N41/02 A01N41/04 A01N59/02 A01N59/08
C11D17/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A01N C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2012/049202 A1 (HENKEL AG & CO KGAA [DE]; CORBELLINI FRANCESCA [DE]; ERNST ANKE [DE];) 19 April 2012 (2012-04-19) cited in the application page 3, paragraph 2 page 4, paragraph 1 page 7, paragraph 1 page 7, paragraph 4 page 8; examples E1-E3 ----- -/--	1-13



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

21 July 2017

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/060990

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2014/108664 A1 (RECKITT BENCKISER BRANDS LTD [GB]) 17 July 2014 (2014-07-17) page 5, line 7 - line 22 page 21, line 28 - page 22, line 5 page 25, line 24 - page 26, line 6 page 28; example E5; table 1 page 30; table 2 page 36, line 14 - page 37, line 10; tables 1,4 -----	1-13
A	RO 116 484 B (SC FALDO KARMA IMPEX SRL [RO]) 28 February 2001 (2001-02-28) cited in the application page 1, line 31 - last line; claim 1; examples 1-2 -----	1-13
A	WO 2015/078679 A1 (UNILEVER NV [NL]; UNILEVER PLC [GB]; CONOPCO INC DBA UNILEVER [US]) 4 June 2015 (2015-06-04) page 12; table 1 page 14; table 2 -----	1-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2017/060990

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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WO 2014108664 A1	17-07-2014	EP 2943559 A1 US 2015351405 A1 WO 2014108664 A1	18-11-2015 10-12-2015 17-07-2014
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