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(54) Title: SANITARY CLEANER

(57) Abstract: The invention relates to an aqueous sanitary cleaning composition comprising a sulfamic acid in an amount of about  $\leq 10$  wt.-%, isotridecanol ethoxylate in an amount of about less than 3 wt.-%, a perfume in an amount in a range of about  $\geq 0.2$  wt.-% to  $\leq 0.5$  wt.-%, and water, wherein the wt.-% of the components are based on the total weight of the sanitary cleaning composition, and wherein the perfume comprises at least one of the compounds according to the general formulas I, II and III, and/or a compound according to the general formula IV.

## SANITARY CLEANER

### Field of the Invention

The invention relates to an aqueous sanitary cleaning composition and to the  
5 use of said cleaning composition for cleaning of surfaces in the sanitary area,  
especially of surfaces in bathrooms.

### Background of the Invention

Any discussion of the prior art throughout the specification should in no way  
10 be considered as an admission that such prior art is widely known or forms part of  
common general knowledge in the field.

Aqueous cleaning compositions for the removal of dirt and soiling in sanitary  
areas are well-known. These compositions normally are based on a combination of  
inorganic and/or organic acids and surfactants. As additional agents these  
15 compositions often further comprise colouring agents, perfumes, viscosity control  
agents, disinfecting and bleaching agents, preservatives, and further auxiliary  
substances.

For the removal of persistent lime scale it is required that a cleaning  
composition has a high acidity. Since strong inorganic acids such as hydrochloric acid  
20 and sulphuric acid lead to corrosion of metallic surfaces, material incompatibility and  
cause environmental pollution, nowadays cleaning compositions that are based on  
sulfamic acid are widely used. Document WO 2005/103218 for example describes a  
highly acidic, polysaccharide thickening, aqueous cleaning and decalcifying agent for  
hard surfaces, containing a combination of 5 to 10 wt.% amidosulfonic acids and 4 to  
25 10 wt.% lactic acid. The cleaning and decalcifying agent is used, in particular, as a  
decalcifying agent or as a sanitary cleaner. Such sulfamic acid-based cleaning  
compositions have a high-scale removing capability.

Another problem of sanitary areas is bad sanitary smell such as of urine or  
feces. While known sanitary cleaners are designed for standard soil, a usual sanitary  
30 cleaner does not cover high amounts of bad sanitary smell. Hence, particularly the  
odor control provided by sanitary cleaners may be improved.

It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

It is an object of an especially preferred form of the present invention to provide a sanitary cleaner providing an improved odor control.

5 Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise", "comprising", and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".

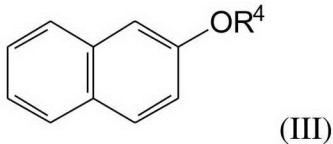
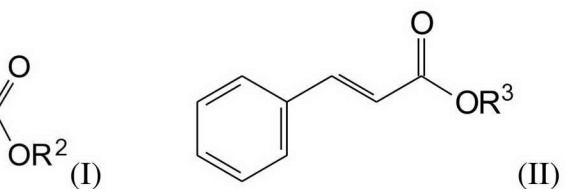
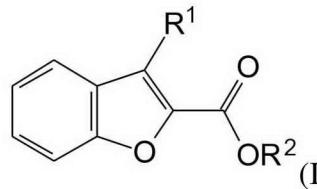
10 Although the invention will be described with reference to specific examples it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

### Summary of the Invention

According to a first aspect of the present invention there is provided an  
15 aqueous sanitary cleaning composition comprising:  
a sulfamic acid or sulfamic acid derivative in an amount of about  $\leq 10$  wt.-%,  
isotridecanol ethoxylate in an amount of about less than 3 wt.-%,  
a perfume in an amount in a range of about  $\geq 0.2$  wt.-% to  $\leq 0.5$  wt.-%,  
20 and  
water,

wherein the wt.-% of the components are based on the total weight of the sanitary cleaning composition, and wherein the perfume comprises at least one of the following compounds according to the general formulas I, II and III:

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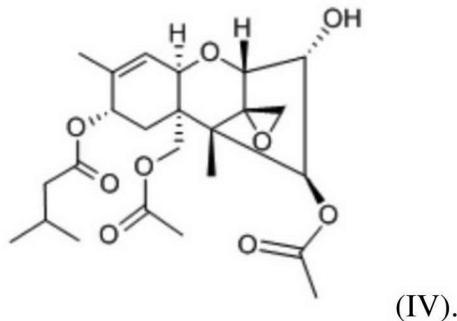
wherein:

$R^1$  is selected from the group consisting of hydrogen and  $C_{1-5}$  alkyl, and  
 $R^2$ ,  $R^3$ ,  $R^4$  independently is selected from the group consisting of  $C_{1-5}$

alkyl; and/or

5

a compound according to the general formula IV:



According to a second aspect of the present invention there is provided an aqueous sanitary cleaning solution obtained by diluting the sanitary cleaning 10 composition according to the first aspect of the present invention in water.

According to a third aspect of the present invention there is provided a method for cleaning a sanitary surface comprising applying to the surface to be cleaned an aqueous sanitary cleaning composition of the first aspect of the present invention or an aqueous sanitary cleaning solution of the second aspect of the present invention.

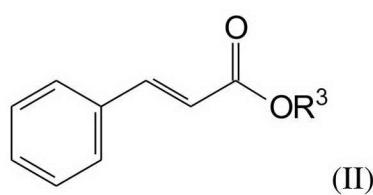
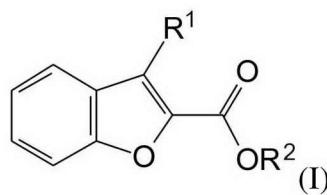
15 According to a fourth aspect of the present invention there is provided use of a sanitary cleaning composition of the first aspect of the present invention or an aqueous sanitary cleaning solution of the second aspect of the present invention for the cleaning of a sanitary surface.

In one form, the disclosure provides an aqueous sanitary cleaning composition 20 comprising:

- a sulfamic acid or sulfamic acid derivative in an amount of about  $\leq 10$  wt.-%,
- isotridecanol ethoxylate in an amount of about less than 3 wt.-%,
- a perfume in an amount in a range of about  $\geq 0.2$  wt.-% to  $\leq 0.5$  wt.-%, and
- water,

wherein the wt.-% of the components are based on the total weight of the sanitary cleaning composition, and wherein the perfume comprises at least one of the following compounds according to the general formulas I, II and III:

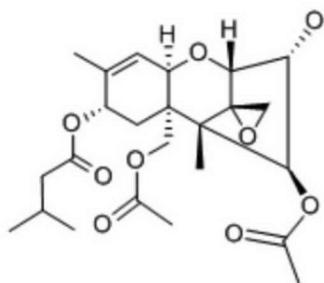
5



10

wherein:

$R^1$  is selected from the group consisting of hydrogen and  $C_{1-5}$  alkyl, and  
 $R^2$ ,  $R^3$ ,  $R^4$  independently is selected from the group consisting of  $C_{1-5}$  alkyl; and/or  
a compound according to the general formula IV:



(IV).

It has been surprisingly found that the combination of acid, surfactant and perfume provided by the disclosure may provide the advantage of safe handling of the aqueous sanitary cleaning composition, and cleaning success in regard of the soil in the sanitary area combined with a long-lasting control of bad smells. The aqueous sanitary cleaning composition can clean the existing soil in the sanitary area and cover the bad smells. The aqueous sanitary cleaning composition further can be used without personal protective equipment. The aqueous sanitary cleaning composition particularly can provide for an improved odor control in sanitary areas.

20

In another form, the disclosure provides an aqueous sanitary cleaning solution obtainable by diluting the sanitary cleaning composition in water. It has also been

found that the aqueous sanitary cleaning solution can provide a good cleaning success in regard of the soil in the sanitary area combined with a long-lasting control of bad smells. The aqueous sanitary cleaning solution can clean the existing soil in the sanitary area and neutralize the bad smells.

5 In another form, the disclosure provides a method for the cleaning of a sanitary surface comprising applying to the surface to be cleaned an aqueous sanitary cleaning composition or an aqueous sanitary cleaning solution.

10 In another form, the disclosure provides the use of the sanitary cleaning composition or the aqueous sanitary cleaning solution for the cleaning of a sanitary surface.

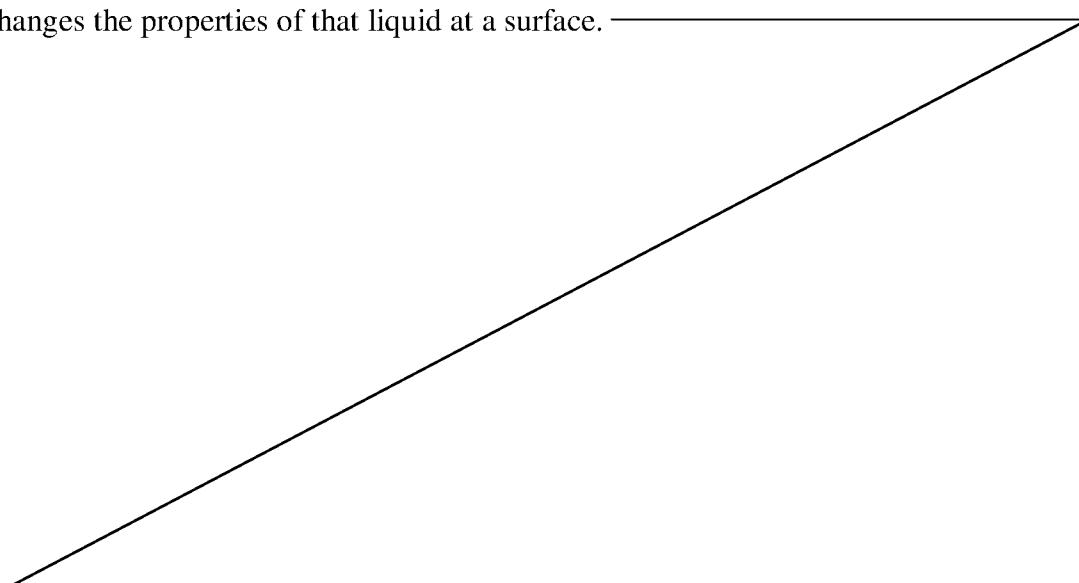
Other aspects and embodiments are encompassed by the disclosure and will become apparent in light of the following description.

### **Detailed Description of the Invention**

15 For the following defined terms, these definitions shall be applied, unless a different definition is given in the claims or elsewhere in this specification.

The term “aqueous” composition or solution refers to a composition or solution in which the solvent is water. An aqueous sanitary cleaning composition refers to a sanitary cleaning composition in which the solvent is water.

20 The term “surfactant” refers to an organic chemical that when added to a liquid changes the properties of that liquid at a surface. —————



The term "bad smell" refers to a malodor or a penetrating, objectionable odor, particularly a strong fecal odor, from which a typical person withdraws if able to.

The term "alkyl" refers to straight-chain or branched alkyl groups. The term "C<sub>1</sub>-C<sub>5</sub>-alkyl" as used herein refers to straight-chain or branched alkyl groups having 1 to 5 carbon atoms. C<sub>1</sub>-C<sub>5</sub>-alkyl groups can be selected from the group comprising methyl, ethyl and the isomers of propyl, butyl or pentyl, such as isopropyl, isobutyl, tert.-butyl, sec.-butyl and/or isopentyl.

The term "aryl" refers to aromatic groups for example phenyl or naphthyl.

The term "allyl" refers to a structural group -HC=CH-CH<sub>2</sub>- comprising a methylene group attached to a vinyl group.

Weight percent, weight-% or wt.-% are synonyms that refer to the concentration of a substance as the weight of the substance divided by the weight of the composition and multiplied by 100. The weight-% (wt.-%) of the components are calculated based on the total weight amount of the composition, if not otherwise stated.

The total amount of all components of the composition does not exceed 100 wt.-%. The remainder up to 100 wt.-% of the composition or solution can be water. The water content of the composition or solution is simply determined by subtracting the amounts of all the other ingredients from 100 wt.-%.

As used herein, the term "ready to use" refers to a solution that can be directly applied to a surface to be cleaned without any further dilution.

All numeric values are herein assumed to be modified by the term "about", whether or not explicitly indicated. As used herein, the term "about" refers to variation in the numerical quantity that can occur, for example, through typical measuring and liquid handling procedures used for making concentrates or use solutions in the real world; through inadvertent error in these procedures; through differences in the manufacture, source, or purity of the ingredients used to make the compositions or carry out the methods; and the like. The term "about" also encompasses amounts that differ due to different equilibrium

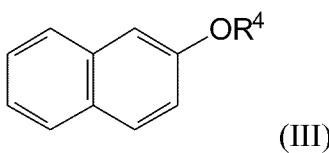
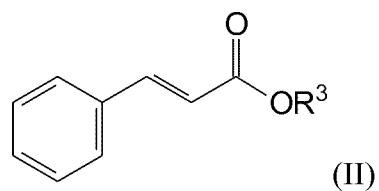
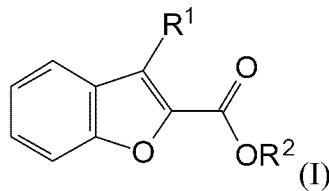
conditions for a composition resulting from a particular initial mixture. Whether or not modified by the term "about", the claims include equivalents to the quantities.

It should be noted that, as used in this specification and the appended claims, the singular forms "a", "an" and "the" include plural referents unless the content clearly dictates otherwise. Thus, for example, reference to a composition containing "a compound" includes a mixture of two or more compounds. It should also be noted that the term "or" is generally employed in its sense including "and/or" unless the content clearly dictates otherwise.

The disclosure provides an aqueous sanitary cleaning composition that is highly effective in odor control. The aqueous sanitary cleaning composition comprises:

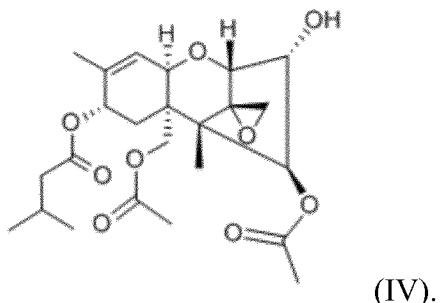
10 - a sulfamic acid or sulfamic acid derivative in an amount of about  $\leq 10$  wt.-%,  
 - isotridecanol ethoxylate in an amount of about less than 3 wt.-%,  
 - a perfume in an amount in a range of about  $\geq 0.2$  wt.-% to  $\leq 0.5$  wt.-%, and  
 - water,

15 wherein the wt.-% of the components are based on the total weight of the sanitary cleaning composition, and wherein the perfume comprises at least one of the following compounds according to the general formulas I, II and III:



wherein:

20 R¹ is selected from the group consisting of hydrogen and C<sub>1-5</sub> alkyl, and  
 R², R³, R⁴ independently is selected from the group consisting of C<sub>1-5</sub> alkyl; and/or a compound according to the general formula IV:



The combination of sulfamic acid and isotridecanol ethoxylate provides a good cleaning success in of the existing soil of sanitary surfaces.

The term "sulfamic acid" as used herein refers to a compound that is also known as 5 amidosulfonic acid, amidosulfuric acid, aminosulfonic acid, and sulfamidic acid. The term "sulfamic acid derivative" refers to N-alkyl, N-aryl or N-allyl derivatives thereof.

The aqueous sanitary cleaning composition may comprise of about  $\geq 5$  wt.-% to about  $\leq 10$  wt.-%, or of about  $\geq 6$  wt.-% to about  $\leq 9$  wt.-%, or of about  $\geq 7$  wt.-% to about  $\leq 8$  wt.-%, based on the total weight of the sanitary cleaning composition, of sulfamic acid or 10 sulfamic acid derivative. In embodiments, the sanitary cleaning composition may comprise sulfamic acid. In an embodiment, the sanitary cleaning composition may comprise of about 8 wt.-%, based on the total weight of the sanitary cleaning composition, of sulfamic acid.

The term "isotridecanol ethoxylate" as used herein refers to an ethoxylated branched C<sub>13</sub>-alcohol of the IUPAC name 11-methyldodecan-1-ol that may contain one or more 15 ethylene oxide groups (EO). The degree of ethoxylation refers to a statistical mean values which for a special product may be either a whole number or a fractional number. The isotridecanol ethoxylate may contain 3 to 40 ethylene oxide groups (3-40EO), 6 to 30 ethylene oxide groups (6-30EO), 7 to 20 ethylene oxide groups (7-20EO), or 8 to 10 ethylene 20 oxide groups (8-10EO). In an embodiment, the aqueous sanitary cleaning composition may comprise isotridecanol ethoxylate with 8 ethylene oxide groups (8EO). The aqueous sanitary cleaning composition may comprise of about  $\geq 0.5$  wt.-% to about  $< 3$  wt.-%, or of about  $\geq 0.5$  wt.-% to about  $\leq 2$  wt.-%, or of about  $\geq 0.8$  wt.-% to about  $\leq 1$  wt.-%, based on the total weight of the sanitary cleaning composition, of isotridecanol ethoxylate. In embodiments, the

sanitary cleaning composition may comprise of about  $\geq 0.9$  wt.-% to about  $\leq 0.99$  wt.-% isotridecanol ethoxylate, based on the total weight of the sanitary cleaning composition. In an embodiment, the sanitary cleaning composition may comprise of about 0.99 wt.-% isotridecanol ethoxylate, based on the total weight of the sanitary cleaning composition.

5 The aqueous sanitary cleaning composition comprises sulfamic acid or a sulfamic acid derivative in an amount of about  $\leq 10$  wt.-% and isotridecanol ethoxylate in an amount of about less than 2 wt.-%, based on the total weight of the sanitary cleaning composition. In another embodiment, the aqueous sanitary cleaning composition may comprise sulfamic acid or a sulfamic acid derivative in an amount of about  $\leq 8$  wt.-% and isotridecanol ethoxylate in 10 an amount of about less than 1 wt.-%, based on the total weight of the sanitary cleaning composition. In embodiments, the aqueous sanitary cleaning composition may comprise of about  $\geq 5$  wt.-% to about  $\leq 10$  wt.-% sulfamic acid or a sulfamic acid derivative and of about  $\geq 0.5$  wt.-% to about  $< 3$  wt.-% isotridecanol ethoxylate, or of about  $\geq 6$  wt.-% to about  $\leq 9$  wt.-% sulfamic acid or derivative and of about  $\geq 0.5$  wt.-% to about  $< 2$  wt.-% isotridecanol 15 ethoxylate, or of about  $\geq 7$  wt.-% to about  $\leq 8$  wt.-% sulfamic acid or derivative and of about  $\geq 0.8$  wt.-% to about  $< 1$  wt.-% isotridecanol ethoxylate, or of about  $\geq 7$  wt.-% to about  $\leq 8$  wt.-% sulfamic acid or derivative and of about  $\geq 0.9$  wt.-% to about  $\leq 0.99$  wt.-% isotridecanol ethoxylate, based on the total weight of the sanitary cleaning composition. Such combinations of surfactant and acid provide for a safe handling of the composition.

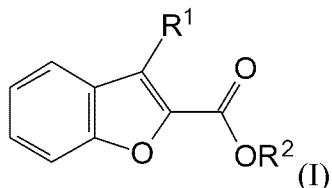
20 Particularly, the composition can be used without personal protective equipment. This provides that a user needs not be specifically trained or follow demanding safety standards when using the cleaning composition.

25 The aqueous sanitary cleaning composition further comprises a perfume. The term "perfume" as used herein refers to a mixture of fragrant substances or compounds and auxiliary materials such as fixatives and solvents used to provide a favorable smell, for example to objects, living spaces, or textiles. The perfume comprises at least one of the compounds according to the general formulas I, II, and III and/or the compound according to the general formula IV. In addition, the perfume may contain auxiliary materials such as

carriers, diluents, fixatives, extenders, stabilizers, and solvents. The aqueous sanitary cleaning composition can provide a long-lasting odor control. Without being bound to a special theory it is assumed that this effect is attributed to the perfume comprising at least one of the compounds according to the general formulas I, II, and III and/or the compound according to 5 the general formula IV.

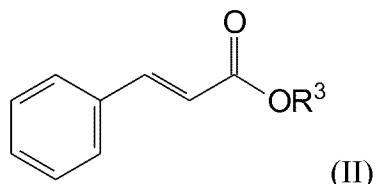
The perfume may comprise at least one of the compounds according to the general formulas I, II, and III. The perfume may comprise any mixture or combination thereof. For example the sanitary cleaning composition may comprise the compounds according to the general formulas I and II, or II and III, or I and III, or I, II and III. While either of the 10 compounds and particularly mixtures of at least two of the compounds can provide an improvement in suppressing bad smell in the sanitary area, a combination of the compounds can provide even better covering of a bad sanitary smell. Particularly, the fecal malodor of skatol can be covered with a combination of the compounds according to the general formulas I, II and III.

15 The compound according to the general formula I has the following formula:



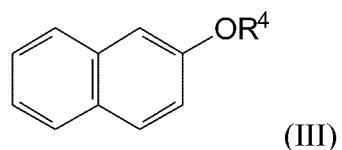
wherein R<sup>1</sup> is selected from the group consisting of hydrogen and C<sub>1-5</sub> alkyl, and R<sup>2</sup> is selected from the group consisting C<sub>1-5</sub> alkyl. The C<sub>1</sub>-C<sub>5</sub>-alkyl groups can be independently from each other a straight-chain group selected from the group consisting of methyl, ethyl, 20 propyl, butyl, and pentyl. In an embodiment R<sup>1</sup> can be selected from the group consisting of hydrogen and C<sub>1-3</sub> alkyl. R<sup>1</sup> can be hydrogen. Alternatively R<sup>1</sup> can be methyl, ethyl, or propyl. In another embodiment, R<sup>2</sup> can be selected from the group consisting of C<sub>1-3</sub> alkyl. R<sup>1</sup> and R<sup>2</sup> independently from each other can be methyl, ethyl, or propyl. Compounds according to the general formula I wherein R<sup>1</sup> is hydrogen or C<sub>1-3</sub> alkyl, and R<sup>2</sup> is C<sub>1-3</sub> alkyl can show good 25 effects in covering fecal smells.

The compound according to the general formula II has the following formula:



wherein R<sup>3</sup> is selected from the group consisting of C<sub>1-5</sub> alkyl. The C<sub>1</sub>-C<sub>5</sub>-alkyl group can be a straight-chain group selected from the group consisting of methyl, ethyl, propyl, butyl, and pentyl. In an embodiment, R<sup>3</sup> is selected from the group consisting of C<sub>1-4</sub> alkyl. R<sup>3</sup> can be methyl, ethyl, propyl, or butyl.

The compound according to the general formula III has the following formula:



wherein R<sup>4</sup> is selected from the group consisting of C<sub>1-5</sub> alkyl. The C<sub>1</sub>-C<sub>5</sub>-alkyl group can be a straight-chain group selected from the group consisting of methyl, ethyl, propyl, butyl, and pentyl. In an embodiment, R<sup>4</sup> is selected from the group consisting of C<sub>1-3</sub> alkyl. R<sup>4</sup> can be methyl, ethyl, or propyl. Also the compounds according to the general formulas II and III wherein R<sup>3</sup> is C<sub>1-4</sub> alkyl, and R<sup>4</sup> is C<sub>1-3</sub> alkyl, respectively, can show good effects in covering fecal smells in the sanitary area.

15 The perfume can comprise alternatively or additionally to the compounds according to the general formulas I, II, and III the compound according to the general formula IV. The perfume can comprise any mixture or combination thereof. The perfume can comprise the compound according to the general formula IV and at least one of the compounds according to the general formulas I, II and III. A mixture of the compound according to the formula IV and at least one the compound according to the general formulas I, II or III can provide an improvement in odor control compared to the use of one of the compounds alone. For example the perfume can comprise mixtures of the compounds according to the formulas IV

20

and I, or the formulas IV and II, or the formulas IV and III, or the formulas IV, I and II, or the formulas IV, I and III, or the formulas IV, II and III.

In an embodiment, the perfume can comprise a compound according to the general formulas I, II and III and the compound according to the general formula IV. A combination 5 of the compounds according to the general formulas I, II, III and IV can provide even better covering of a bad sanitary smell. A combination of the compound according to the general formula IV and the compounds according to the general formulas I, II, and III can cover the bad smells in the sanitary area and provide a long lasting odor control.

In an embodiment, the sanitary cleaning composition may comprise of about  $\geq 0.2$  10 wt.-% to about  $\leq 0.4$  wt.-%, or of about  $\geq 0.25$  wt.-% to about  $\leq 0.35$  wt.-%, or of about 0.3 wt.-% to about  $\leq 0.35$  wt.-%, based on the total weight of the sanitary cleaning composition, of the perfume. In another embodiment, the sanitary cleaning composition may comprise of about 0.3 wt.-%, based on the total weight of the sanitary cleaning composition, of the perfume. Already an amount of 0.2 wt.-% to 0.4 wt.-%, or 0.3 wt.-% of the perfume may 15 cover and control high amounts of bad sanitary smell such as urine and provide a long lasting odor control in the sanitary area.

The aqueous sanitary cleaning composition may comprise of about  $\geq 5$  wt.-% to about 20  $\leq 10$  wt.-% sulfamic acid, of about  $\geq 0.5$  wt.-% to about  $< 3$  wt.-% isotridecanol ethoxylate, and of about  $\geq 0.2$  wt.-% to about  $\leq 0.4$  wt.-% perfume, based on the total weight of the sanitary cleaning composition. The aqueous sanitary cleaning composition may comprise of about  $\geq 6$  wt.-% to about  $\leq 9$  wt.-% sulfamic acid, of about  $\geq 0.5$  wt.-% to about  $< 2$  wt.-% isotridecanol ethoxylate, and of about  $\geq 0.25$  wt.-% to about  $\leq 0.35$  wt.-% perfume, based on the total weight of the sanitary cleaning composition. The aqueous sanitary cleaning composition may comprise of about  $\geq 7$  wt.-% to about  $\leq 8$  wt.-% sulfamic acid, of about  $\geq 0.8$  wt.-% to about  $< 1$  wt.-% isotridecanol ethoxylate, and of about  $\geq 0.3$  wt.-% to about  $\leq 0.35$  wt.-% perfume, based on the total weight of the sanitary cleaning composition. In an embodiment, the aqueous sanitary cleaning composition may comprise about 25 8 wt.-%

sulfamic acid, about 0.99 wt.-% isotridecanol ethoxylate, and about 0.3 wt.-% perfume, based on the total weight of the sanitary cleaning composition.

The sanitary cleaning composition may comprise urea. In some embodiments, the sanitary cleaning composition may comprise of about  $\geq 2$  wt.-% to about  $\leq 5$  wt.-%, or of about  $\geq 2.5$  wt.-% to about  $\leq 4$  wt.-%, or of about  $\geq 3$  wt.-% to about  $\leq 3.5$  wt.-%, based on the total weight of the sanitary cleaning composition, urea. Urea can increase the solubility and stability of the perfumes in the aqueous sanitary cleaning composition. In an embodiment, the sanitary cleaning composition may comprise of about 3 wt.-%, based on the total weight of the sanitary cleaning composition, of urea.

10 The sanitary cleaning composition may comprise a C2 to C3 alcohol. The C2 to C3 alcohol can be selected from the group consisting of ethanol, 1-propanol and 2-propanol or mixtures thereof. According to one embodiment, the sanitary cleaning composition can comprise ethanol. In some embodiments, the sanitary cleaning composition may comprise of about  $\geq 0.5$  wt.-% to about  $\leq 3$  wt.-%, or of about  $\geq 0.7$  wt.-% to about  $\leq 2$  wt.-%, or of about  $\geq 1$  wt.-% to about  $\leq 1.5$  wt.-%, based on the total weight of the sanitary cleaning composition, of a C2 to C3 alcohol, preferably of ethanol. In an embodiment, the sanitary cleaning composition may comprise of about 1 wt.-%, based on the total weight of the sanitary cleaning composition, of ethanol. The alcohol may improve the stability of the sanitary cleaning composition. The alcohol further may be used to solve the perfume and/or other auxiliary compounds in a premix solution that is then used to formulate the sanitary cleaning composition.

15 20

25 The sanitary cleaning composition may optionally comprise additional components such as one or more of surfactants, disinfection agents, dyes, preservatives and/or corrosion inhibitors. Various dyes and other aesthetic enhancing agents may be included in the composition. Dyes may be included to alter the appearance of the composition, as for example, Basic Violet, Acid Yellow or Acid Orange. For example, the composition may comprise Basic Violet 10, Acid Yellow 23, Acid Yellow 3, or Acid Yellow 17.

Water can be added to the sanitary cleaning composition to reach 100 wt.-% of the composition. The water content of the sanitary cleaning composition may thus simply be determined by subtracting the amounts of the compounds used from 100 wt.-%.

5 The aqueous sanitary cleaning composition particularly is suitable for the cleaning of sanitary areas. The sanitary cleaning composition can be used without diluting or may be used in a diluted form that is also referred to as a use-solution or a solution that is ready to use. For example if used periodically or for persistent soiling, the aqueous sanitary cleaning composition may be used without dilution or as a highly concentrated dilution. For a diluted sanitary cleaning composition, also referred to as aqueous sanitary cleaning solution, water 10 can be added to the sanitary cleaning composition.

The invention further relates to an aqueous sanitary cleaning solution obtainable by diluting the sanitary cleaning composition as described above in water. The diluted aqueous sanitary cleaning solution particularly can show good cleaning effects of the existing soil in the sanitary area. The aqueous sanitary cleaning solution can clean the existing soil in the 15 sanitary area and cover the bad smells. The aqueous sanitary cleaning solution can provide a long lasting odor control in sanitary areas. The solution may be used at any desired dilution of the sanitary cleaning composition in water. The solution may comprise of about  $\geq 1$  wt.-% to about  $< 100$  wt.-% of the sanitary cleaning composition, based on the total weight of the sanitary cleaning solution. In some embodiments, the aqueous sanitary cleaning solution may 20 comprise of about  $\geq 50$  wt.-% to about  $< 100$  wt.-% of the sanitary cleaning composition, based on the total weight of the sanitary cleaning solution. Such highly concentrated dilutions may be used periodically or for persistent soiling. In other embodiments, the aqueous sanitary cleaning solution may comprise of about  $\geq 1$  wt.-% to about  $\leq 3$  wt.-% of the sanitary cleaning composition, based on the total weight of the sanitary cleaning solution. Such 25 dilutions may be used for regular for example daily cleaning or minor soiling.

The aqueous sanitary cleaning composition and the aqueous sanitary cleaning solution may be applied in liquid form, by spraying or as a foam. The aqueous sanitary cleaning

composition and the aqueous sanitary cleaning solution may particularly be applied in liquid form.

The aqueous sanitary cleaning composition and in particular a dilution such as the aqueous sanitary cleaning solution are useful for the cleaning of various sanitary areas and surfaces. The disclosure further relates to a method for cleaning a sanitary surface comprising applying to the surface to be cleaned an aqueous sanitary cleaning composition or an aqueous sanitary cleaning solution as described above. Examples for surfaces to be cleaned include hard and soft surfaces, for example of upper outer and/or inner outer surfaces of materials such as ceramic, plastic, glass and/or metal. The solution or the composition can come into contact with the surface by spraying it onto the surface. The aqueous sanitary cleaning solution or composition may be applied using a dosing pump or a manual dosed system. The aqueous sanitary cleaning solution or composition may be applied by using a dispenser or a solid support soaked with the sanitary cleaning solution or composition. The support can be a woven or non- woven fabric, a textile, a paper towel, cotton wool, an absorbent polymer sheet or a sponge. The sanitary cleaning solution or composition may be used at any temperature, preferably at ambient temperature. The sanitary cleaning solution or composition may be provided by a manual dosed system, surgery pouches. The sanitary cleaning solution or composition can be used for all sanitary areas.

The aqueous sanitary cleaning composition and in particular a dilution such as the aqueous sanitary cleaning solution can be used for the cleaning of sanitary areas and surfaces. The disclosure further relates to the use of the sanitary cleaning composition or the aqueous sanitary cleaning solution for the cleaning of a sanitary surface.

The aqueous sanitary cleaning composition can be formed by mixing together the compounds comprised in the composition. One may begin with water and then add the other compounds to the water. An additional pre-mix step optionally can be included, for example to dissolve the perfume in ethanol and then to add the pre-mix to the aqueous mixture prepared before. An aqueous sanitary cleaning solution can be prepared by diluting the aqueous sanitary cleaning composition in water.

All publications and patent applications in this specification are indicative of the level of ordinary skill in the art to which this invention pertains. The invention has been described to various specific and preferred embodiments and techniques. However, it should be understood that many variations and modifications may be made while remaining within the 5 spirit and scope of the invention.

For a more complete understanding of the invention, the following examples are given to illustrate some embodiments. These examples and experiments are to be understood as illustrative and not limiting.

Unless otherwise noted, all parts, percentages, and ratios reported in the following 10 examples are on a weight basis, and all reagents used in the examples were obtained, or are available, from the chemical suppliers described below, or may be synthesized by conventional techniques.

In the following tests aqueous sanitary cleaning solutions and comparable solutions according to the state of the art were prepared and compared with respect to their lime- 15 removal capacity, cleaning capacity, and odor control ability.

The composition of the invention as shown in Table 1 and the compositions for comparison as shown in Table 3 were prepared by adding the components to water and mixing.

20 Table 1: Components of the aqueous sanitary cleaning composition of the invention

Components (supplier)	Into CLP [wt.-%]
sulfamic acid (Kuang Ming Enterprise)	8
Isotridecanol ethoxylate (8 EO) (BASF)	0.99
perfume (Fragrance Resources)	0.3
Urea prilled (Yara)	3
ethanol (96%) 2% MEK tech grade (Brenntag)	1
Basic violet 10 (BASF)	0.00025
Acid Yellow 3 C (BASF)	0.000624
water, deionized	add. 100

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Compositions Into CLP 1 to Into CLP 7 were prepared by using different perfume compositions. The perfume used for the different compositions Into CLP 1 to Into CLP 7 comprised the compound according to the formula IV and the compounds according to the formulas I, II and III having the groups R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup>, respectively, as shown in Table 2:

5

Table 2: Compounds I, II and III of the aqueous sanitary cleaning compositions

Composition	perfume			
	Compound I		Compound II	Compound III
	R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup>
Into CLP 1	-C <sub>3</sub> H <sub>7</sub>	-C <sub>3</sub> H <sub>7</sub>	-C <sub>3</sub> H <sub>7</sub>	-C <sub>3</sub> H <sub>7</sub>
Into CLP 2	-C <sub>2</sub> H <sub>5</sub>	-C <sub>4</sub> H <sub>9</sub>	-CH <sub>3</sub>	-C <sub>2</sub> H <sub>5</sub>
Into CLP 3	-CH <sub>3</sub>	-C <sub>5</sub> H <sub>11</sub>	-C <sub>3</sub> H <sub>7</sub>	-C <sub>5</sub> H <sub>11</sub>
Into CLP 4	-C <sub>3</sub> H <sub>7</sub>	-C <sub>5</sub> H <sub>11</sub>	-C <sub>2</sub> H <sub>5</sub>	-C <sub>2</sub> H <sub>5</sub>
Into CLP 5	-C <sub>2</sub> H <sub>5</sub>	-C <sub>4</sub> H <sub>9</sub>	-C <sub>4</sub> H <sub>9</sub>	-CH <sub>3</sub>
Into CLP 6	-CH <sub>3</sub>	-C <sub>4</sub> H <sub>9</sub>	-C <sub>2</sub> H <sub>5</sub>	-CH <sub>3</sub>
Into CLP 7	-C <sub>3</sub> H <sub>7</sub>	-C <sub>2</sub> H <sub>5</sub>	-CH <sub>3</sub>	-C <sub>4</sub> H <sub>9</sub>

10 Aqueous sanitary cleaning solutions with different amounts of the compositions were prepared by diluting the respective composition comprising the components according to the amounts listed in Table 1 in water.

15

20

Table 3: Compositions for comparison

Components (supplier)	Into maxx [wt.-%]	Into citrus [wt.-%]
sulfamic acid (Kuang Ming Enterprise)	4	9
Lactic acid 80% (Purac)	3.41	0
Isotridecanol ethoxylate (8 EO) (BASF)	0	2.65
Longchain alcohol alkoxylated (BASF)	2.5	0
Perfume Fresh lemon (Drom)	0,4	0
Perfume 04-8549 (HFC)	0	0.5
Urea prilled (Yara)	5	5
ethanol (96%) 2% MEK tech grade (Brenntag)	1	2
Basic violet 10 (BASF)	0.00025	0.00025
Acid Yellow 3 C (BASF)	0.000625	0.000625
water, deionized	add. 100	add. 100

The compositions for comparison as shown above in Table 3 were prepared by adding the components to water and mixing. Milizid® was purchased at Dr. Schnell Chemie GmbH, 5 Germany. Solutions were prepared by diluting the compositions in water.

#### Example 1

##### Cleaning ability

The following example was carried out to illustrate the cleaning ability by wet 10 abrasion scrub tester. Aqueous sanitary cleaning solutions comprising 1 wt.-% or 3 1 wt.-% of the composition, the undiluted composition and the compositions and solutions for comparison were poured on an artificially soiled white PVC test strip with a sponge and afterwards the whiteness of the test strips was analyzed by a chromatometer.

White PVC strips (White PVC-film Benova 4812080, 1.3 m / 50 m / 0.12 mm as 15 purchased from Benecke-Kaliko AG) were coated with 2 g of Standard test soil (IPP 83/21, wfk Krefeld) using a flat paintbrush with flat bristles, about 55 mm wide. Two grams test soil was applied with the flat brush on the white PVC foil. Horizontal strokes were alternated with

vertical strokes 7 times in each direction. The final coat was at right angles to the scouring movement. The soil was allowed to dry for one hour.

For the evaluation of the cleaning capacity the following test was undertaken for the aqueous sanitary cleaning solutions and composition Into CLP 1 and the solutions for comparison as given in Table 3 above.

A polyester sponge submerged in water was removed from the water and allowed to drain. The sponge was compressed for 10 seconds in a sponge press and placed in a Gardner apparatus (Gardner wet abrasion scrub tester apparatus model 494 (DIN- ASTM-515), Erichsen GmbH & Co. KG) with a weight of 400 g. Twelve ml of the aqueous sanitary cleaning solution or the solutions for comparison was poured on top of the soiled strip and the sponge. The cycle counter on the Gardner apparatus was set to 10. Upon completion of the wipe cycle, the sponge was discarded. The test strip was rinsed under running deionized water and hung for drying. Each solution was tested on 6 strips. For comparison, 6 strips were cleaned with tap water only.

The whiteness of the test strips was analyzed by a Minolta Chroma Meter CR-200 (Minolta). The instrument was calibrated with the provided white tile. The reflection of the test strips was taken at 7 different spots per strip. The average of the result gives the percentage of the cleanability. Single large deviating results were rejected from the calculation.

20

Valuation of the results:

For the aqueous sanitary cleaning solution and composition and the solutions for comparison, the average was calculated for all measurements:

$$\bar{x} = \frac{1}{N} \sum_{i=1}^N x_i$$

25      N =                    number of measurements (6 x 7 = 42)  
           x =                    degree of whiteness per measure spot  
           xarithm =            Average cleaning performance

Standard deviation:

$$s_x^2 := \frac{1}{N-1} \sum_{i=1}^N (x_i - \bar{x})^2$$

5 As the measurements are influenced by the quality of water and the environmental conditions in the laboratory such as temperature and humidity, only results achieved at once and on the same day were compared.

The test results of the aqueous sanitary cleaning solutions and composition and the solutions for comparison are shown in Table 4 below.

10

Table 4: Gardner test of cleaning ability:

performance [%]	water	Into CLP 1	Into maxx	Into citrus	Milizid®
1 wt.-% solution	35.46	38.23	40.58	37.47	37.92
3 wt.-%solution	35.46	38.84	40.15	45.00	37.63
100 wt.-%	35.46	57.94	72.35	62.59	59.25

15 As can be seen from the results in Table 4, the cleaning capacity of the aqueous sanitary cleaning solutions and compositions of the invention Into CLP 1 is comparable to the cleaning capacity of the solutions according to the state of the art. As expected, the undiluted compositions showed more pronounced cleaning ability compared to the solutions comprising 1 wt.-% or 3 wt.-% of the composition, based on the total weight of the sanitary cleaning solution. This shows that the composition may be used periodically or for persistent soiling, while the solutions show satisfactory cleaning effect to be used for regular cleaning or minor 20 soiling.

The Gardner test of cleaning ability as described above was repeated with the aqueous sanitary cleaning solutions and compositions of the invention Into CLP 2 to Into CLP 7 and

the respective solutions for comparison. The results of the cleaning ability of CLP 2 to Into CLP 7 showed only minor deviation to Into CLP 1.

### Example 2

#### 5 Lime removal capacity

The lime-removal capacity was tested using the marble block method. Marble blocks (Bianco Cararra) of 30x30x20 mm dimension with one polished side were brushed under water and rinsed with ethanol to remove oil/fat stain. After that the marble-blocks were dried for 5 hours in a drying chamber at 120°C. The hot marble blocks were put in a desiccator and 10 weighted when cold on the analytical scale. “Cold” as used herein refers to room temperature. Room temperature, as used herein, refers to temperatures in the range of 20°C to 25°C.

For the examination of the lime-removing capacity the marble-block were placed in 200 ml of the aqueous sanitary cleaning solution or composition of the invention Into CLP 1 or the solutions for comparison Into maxx, Into citrus, and Milizid® for 1 hour at room 15 temperature. After that the marble blocks were taken out of the solutions, rinsed with demineralised water, dried at 120°C for 5 h and put in a desiccator. The cold marble blocks were weighted. The samples were run in duplicate.

The lime-removing capacity was determined as the amount of marble in milligrams that dissolves within 1 hour. The difference in weight of the marble block at the beginning 20 and in the end of the dissolving procedure is equal to the lime-removing capacity.

The test results of the lime-removal capacity at room temperature for the aqueous sanitary cleaning solution and composition the solutions for comparison are shown in Table 5 below.

#### 25 Table 5: lime-removal capacity

lime-removal capacity [%]	Into CLP 1	Into maxx	Into citrus	Milizid ®
5 wt.-% solution	0.27	0.17	0.29	0.52
100 wt.-%	14.36	8.06	14.05	13.63

- 20 -

The lime removal capacity was evaluated as % = (100/Start weight) x end weight.

As can be seen from the Table 5, the observed lime-removal capacity of the aqueous  
5 sanitary cleaning solution delivered comparable results to the capacity of the solutions  
according to the state of the art and even slightly better.

The test of lime-removal capacity as described above was repeated with the aqueous  
sanitary cleaning solutions and compositions of the invention Into CLP 2 to Into CLP 7 and  
the respective solutions for comparison. The results of the lime-removal capacity of CLP 2 to  
10 Into CLP 7 showed only minor deviation to Into CLP 1.

### Example 3

#### Odor control

The odor control was tested through an “inhouse fieldtest” at different bathrooms and  
15 sanitary areas inhouse. The bathrooms and sanitary areas were cleaned for 3 months daily  
either with the aqueous sanitary cleaning solutions of the invention Into CLP 1 to Into CLP 7  
or a solution for comparison Into maxx, Into citrus, Milizid®, respectively, each using a 1  
wt.-% dilution for hard surfaces and the floor and the undiluted composition (100 wt.-%) for  
the toilet bowl, e.g. toilet bowl using a brush, surfaces by using a microfiber cloth and floor  
20 with a mop. After cleaning 20 persons checked the smell in the rooms. 100% of the asked  
persons noticed a significant improvement of the aqueous sanitary cleaning solution and  
composition of the invention versus the standard solution. The test persons did not recognize  
a difference to the cleaning ability and odor neutralizing of the solutions Into CLP 1 to Into  
CLP 7. Even high frequented bathrooms which were cleaned with Into CLP 1 to Into CLP 7  
25 had still a pleasant smell, while the solutions for comparison had just a short time influence  
on the bad smell.

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In summary, the above evaluations show that the aqueous sanitary cleaning solution and composition according to the invention showed a good lime-removing capacity and good cleaning properties. Moreover, the aqueous sanitary cleaning solution and composition showed a better odor control compared to the solutions of the state of the art.

5

**THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-**

1. An aqueous sanitary cleaning composition comprising:

5 a sulfamic acid or sulfamic acid derivative in an amount of about  $\leq 10$  wt.-%

5 %,

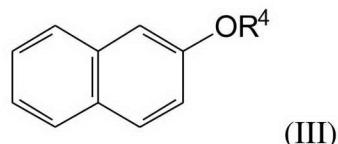
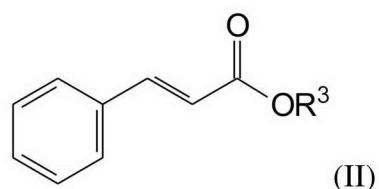
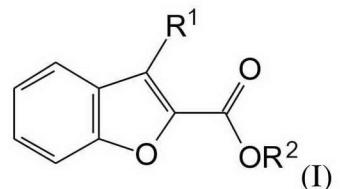
isotridecanol ethoxylate in an amount of about less than 3 wt.-%,

10 a perfume in an amount in a range of about  $\geq 0.2$  wt.-% to  $\leq 0.5$  wt.-%,

and

15 water,

wherein the wt.-% of the components are based on the total weight of the sanitary cleaning composition, and wherein the perfume comprises at least one of the following compounds according to the general formulas I, II and III:



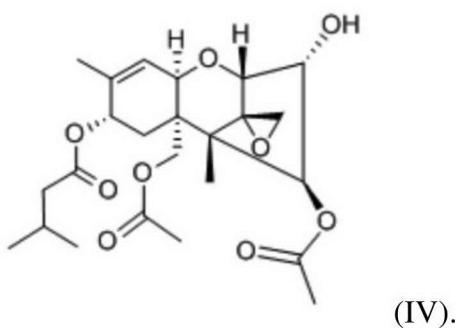
15 wherein:

R¹ is selected from the group consisting of hydrogen and C<sub>1-5</sub> alkyl, and

R², R³, R⁴ independently is selected from the group consisting of C<sub>1-5</sub>

alkyl; and/or

20 a compound according to the general formula IV:



2. A sanitary cleaning composition according to claim 1, wherein the perfume comprises a compound according to the general formulas I, II and III and the compound according to the general formula IV.
- 5 3. A sanitary cleaning composition according to claim 1 or claim 2, wherein the sanitary cleaning composition comprises of about  $\geq 5$  wt.-% to about  $\leq 10$  wt.-%, based on the total weight of the sanitary cleaning composition, of sulfamic acid or a sulfamic acid derivative.
- 10 4. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq 6$  wt.-% to about  $\leq 9$  wt.-%, based on the total weight of the sanitary cleaning composition, of sulfamic acid or a sulfamic acid derivative.
- 15 5. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq 7$  wt.-% to about  $\leq 8$  wt.-%, based on the total weight of the sanitary cleaning composition, of sulfamic acid or a sulfamic acid derivative.
- 20 6. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq 0.5$  wt.-% to about  $< 3$  wt.-%, based on the total weight of the sanitary cleaning composition, of isotridecanol ethoxylate.
- 25 7. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq 0.5$  wt.-% to about  $< 2$  wt.-%, based on the total weight of the sanitary cleaning composition, of isotridecanol ethoxylate.
- 30 8. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq 0.8$  wt.-% to

about < 1 wt.-%, based on the total weight of the sanitary cleaning composition, of isotridecanol ethoxylate.

9. A sanitary cleaning composition according to any one of the preceding claims,  
5 wherein the sanitary cleaning composition comprises of about  $\geq 0.9$  wt.-% to about  $\leq 0.99$  wt.-%, based on the total weight of the sanitary cleaning composition, of isotridecanol ethoxylate.

10. A sanitary cleaning composition according to any one of the preceding claims,  
10 wherein  $R^1$  is selected from the group consisting of hydrogen and  $C_{1-3}$  alkyl.

11. A sanitary cleaning composition according to any one of the preceding claims,  
15 wherein  $R^2$  is selected from the group consisting of  $C_{1-3}$  alkyl.

12. A sanitary cleaning composition according to any one of the preceding claims,  
20 wherein  $R^3$  is selected from the group consisting of  $C_{1-4}$  alkyl.

13. A sanitary cleaning composition according to any one of the preceding claims,  
25 wherein  $R^4$  is selected from the group consisting of  $C_{1-3}$  alkyl.

14. A sanitary cleaning composition according to any one of the preceding claims,  
30 wherein the sanitary cleaning composition comprises of about  $\geq 0.2$  wt.-% to about  $\leq 0.4$  wt.-%, based on the total weight of the sanitary cleaning composition, perfume.

15. A sanitary cleaning composition according to any one of the preceding claims,  
35 wherein the sanitary cleaning composition comprises of about  $\geq 0.25$  wt.-% to about  $\leq 0.35$  wt.-%, based on the total weight of the sanitary cleaning composition, perfume.

16. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about 0.3 wt.-% to about  $\leq$  0.35 wt.-%, based on the total weight of the sanitary cleaning composition, perfume.
17. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq$  2 wt.-% to about  $\leq$  5 wt.-%, based on the total weight of the sanitary cleaning composition, urea.
18. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq$  2.5 wt.-% to about  $\leq$  4 wt.-%, based on the total weight of the sanitary cleaning composition, urea.
19. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq$  3 wt.-% to about  $\leq$  3.5 wt.-%, based on the total weight of the sanitary cleaning composition, urea.
20. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq$  0.5 wt.-% to about  $\leq$  3 wt.-%, based on the total weight of the sanitary cleaning composition, of a C2 to C3 alcohol.
21. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq$  0.7 wt.-% to about  $\leq$  2 wt.-%, based on the total weight of the sanitary cleaning composition, of a C2 to C3 alcohol.,
22. A sanitary cleaning composition according to any one of the preceding claims, wherein the sanitary cleaning composition comprises of about  $\geq$  1 wt.-% to about

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≤ 1.5 wt.-%, based on the total weight of the sanitary cleaning composition, of a C2 to C3 alcohol.

23. A sanitary cleaning composition according to any one of claims 20 to 22, wherein  
5 the C2 to C3 alcohol is ethanol.

24. An aqueous sanitary cleaning solution obtained by diluting the sanitary cleaning composition according to claims 1 to 23 in water.

10 25. A method for cleaning a sanitary surface comprising applying to the surface to be cleaned an aqueous sanitary cleaning composition of claims 1 to 23 or an aqueous sanitary cleaning solution of claim 24.

15 26. Use of a sanitary cleaning composition of claims 1 to 23 or an aqueous sanitary cleaning solution of claim 24 for the cleaning of a sanitary surface.

Dated this 5th day of April 2017

20 Shelston IP

Attorneys for: Ecolab USA Inc.