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(54) [Title of Invention] STERILIZING CLEANER COMPOSITION FOR HARD SURFACES

(57) [Abstract]

[Problem] Provided is a sterilizing cleaner composition for hard surfaces that exhibits high sterilization effect against spore-forming bacteria and mold.

[Resolution Means] A sterilizing cleaner composition for hard surfaces, containing water and an organic peracid obtained by reacting (A) an ester of a polyhydric alcohol and an organic acid with (B1) hydrogen peroxide in a specific molar ratio in water at a pH of 8 to 12, and having a pH of 1 or more and less than 7 at 25°C.

[Selected Drawing] None

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[Scope of Patent Claims]

[Claim 1]

A sterilizing cleaner composition for hard surfaces, comprising water and an organic peracid obtained by reacting (A) an ester of a polyhydric alcohol and an organic acid having a hydrocarbon group that may have a hydroxyl group and (B1) hydrogen peroxide in water at a molar ratio of (A)/(B1) = 1/10 to 20/1 and at a pH of 8 to 12, and which has a pH of 1 or more to 7 or less at 25°C.

[Claim 2]

The sterilizing cleaner composition for hard surfaces according to claim 1, wherein a hydrogen peroxide content is 0.5 wt% or less.

[Claim 3]

The sterilizing cleaner composition for hard surfaces according to claim 1 or 2, wherein the organic acid constituting (A) is a fatty acid having 1 to 8 carbon atoms.

[Claim 4]

The sterilizing cleaner composition for hard surfaces according to any one of claims 1 to 3, further comprising a surfactant.

[Claim 5]

The sterilizing cleaner composition for hard surfaces according to claim 4, wherein the surfactant is at least one type selected from the group consisting of anionic surfactants and nonionic surfactants.

[Claim 6]

A method for producing a sterilizing cleaner composition for hard surfaces, comprising steps for reacting (A) an ester of a polyhydric alcohol and an organic acid having a hydrocarbon group, which may have a hydroxyl group, and (B1) hydrogen peroxide in a molar ratio of (A)/(B1) = 1/10 to 20/1 in water at a pH of 8 to 12, and then adjusting the pH of the reaction system to 1 or higher but less than 7.

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[Detailed Description of Invention]

[Technical Field]

[0001]

The present invention relates to a sterilizing cleaner composition for hard surfaces that is suitable for sterilizing and cleaning hard surfaces such as plastics, metals, glass, and tiles.

[Background Art]

[0002]

There are many facilities where a hygienic environment is desired, such as food production plants, pharmaceutical production plants, hospitals, nursing homes, kitchens, bathrooms, and the like. In such cases, careful sterilization of floors, walls, and equipment used and the like is essential in order to maintain a hygienic environment.

[0003]

cleaners, sterilizing agents, and sterilizing cleaners for liquids or powders that contain surfactants, sterilizing agents, and the like are mainly used to sterilize and clean such hard surfaces. Furthermore, when a sterilization and cleaning process is incorporated into an industrial production process, steps such as supplying, mixing, and applying (painting, spraying, and the like) the active ingredient are often automated.

[0004]

As sterilizing cleaners used for sterilization cleaning of such hard surfaces, those containing a chlorine-based disinfectant are known. For example, patent document 1 discloses a sterilizing cleaner composition for hard surfaces that contains a hypochlorite, an amphoteric surfactant and/or a cationic surfactant, and a pH adjusting agent. Furthermore, patent document 2 discloses that hypochlorite can be used in an aqueous composition that contains a specific long-chain amine oxide mixture.

[Patent Document 1] JP 2001-342496 A

[Patent Document 2] JP H9-500680 A (Translation of PCT Application)

[Disclosure of Invention]

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[Problem to Be Solved by Invention]

[0005]

However, conventional sterilizing cleaner compositions for hard surfaces have a low sterilizing effect on spores and molds formed by spore bacteria that are difficult to sterilize, and in order to obtain a sufficient sterilizing and cleaning effect, treatment at a high temperature for a long time is required. In food processing plants, hospitals, and the like, hard surfaces such as floors, walls, equipment, and utensils and the like are susceptible to microbial contamination, and thus sufficient sterilizing and cleaning of these hard surfaces is critical.

[0006]

Disinfectant compositions for hard surfaces that use an oxygen-based disinfectant is advantageous in that the effect on the environment is mild, but further improvement is desired in the sterilizing effect on microorganisms with strong chemical resistance such as bacterial spores. It is known that disinfectants containing peracetic acid are effective against spore-forming bacteria to a certain extent, but they have problems such as being difficult to use because of their odor and creating a poor working environment.

[0007]

An object of the present invention is to provide an oxygen-based sterilizing cleaner composition for hard surfaces which exhibits a high sterilization effect even against highly drug-resistant microorganisms such as spore-forming bacteria.

[Means for Solving Problem]

[0008]

The present invention relates to a sterilizing cleaner composition for hard surfaces, containing water and an organic peracid obtained by reacting (A) an ester of a polyhydric alcohol and an organic acid having a hydrocarbon group that may have a hydroxyl group (herein referred to as component (A)) and (B1) hydrogen peroxide (herein referred to as component (B1)) in water at a molar ratio of (A)/(B1) = 1/10 to 20/1 and at a pH of 8 to 12, and which has a pH of 1 or more to 7 or less at 25°C.

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[0009]

The present invention also relates to a method for producing a sterilizing cleaner composition for hard surfaces, having steps for reacting (A) an ester of a polyhydric alcohol and an organic acid having a hydrocarbon group, which may have a hydroxyl group, and (B1) hydrogen peroxide in a molar ratio of (A)/(B1) = 1/10 to 20/1 in water at a pH of 8 to 12, and then adjusting the pH of the reaction system to 1 or higher but less than 7.

[Effect of Invention]

[0010]

According to the present invention, a sterilizing cleaner composition for hard surfaces is obtained which exhibits excellent detergency on hard surfaces and also exhibits excellent sterilizing power against spores and mold even when treated at a lower temperature and for a shorter period of time than in conventional operations. Furthermore, the composition of the present invention has no odor problem and has little impact on the working environment.

[Best Mode for Carrying Out Invention]

[0011]

<Component (A)>

An ester between a polyhydric alcohol and an organic acid having a hydrocarbon group, which may have a hydroxyl group, of a component (A) reacts with hydrogen peroxide to produce an organic peracid.

[0012]

The polyhydric alcohol constituting the component (A) preferably has 2 to 12 carbon atoms, and examples of such polyhydric alcohols include glycerins such as glycerin, diglycerin, and triglycerin, sugars such as glucose, sucrose, fructose, sorbitol, pentaerythritol, alkyl polyglycosides, and alkyl furanosides.

[0013]

Furthermore, examples of organic acids constituting the component (A) include aliphatic monocarboxylic acids such as acetic acid, propionic acid, butyric acid, valeric acid, caproic acid,

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and octanoic acid, aliphatic dicarboxylic acids such as oxalic acid, malonic acid, succinic acid, maleic acid, and fumaric acid, and hydroxycarboxylic acids having a hydroxyl group such as citric acid, tartaric acid, and malic acid, but are preferably saturated or unsaturated aliphatic mono- or dicarboxylic acids having 1 to 8 carbon atoms, more preferably saturated or unsaturated aliphatic monocarboxylic acids having 1 to 8 carbon atoms, even more preferably fatty acids having 1 to 8 carbon atoms, and particularly preferably fatty acids having 2 to 8 carbon atoms. The degree of esterification of component (A) is not limited.

[0014]

Specifically, the component (A) is preferably an ester of glycerin and an aliphatic monocarboxylic acid having 1 to 8 carbon atoms, and among these, triacetin is preferable.

[0015]

The sterilizing cleaner composition for hard surfaces of the present invention contains water and an organic peracid obtained by reacting component (A) and component (B1) in water in a molar ratio of (A)/(B1) = 1/10 to 20/1 and at a pH of 8 to 12, and has a pH of 1 or more and less than 7 at 25°C. That is, as described above, the sterilizing cleaner composition for hard surfaces of the present invention is prepared by reacting component (A) and component (B1) in water in a specific molar ratio at a pH of 8 to 12, and then adjusting the pH to 1 or more and less than 7, preferably 1 to 6, and more preferably 1 to 5.

[0016]

The sterilizing cleaner composition for hard surfaces of the present invention may contain, in addition to the components (A) and (B1), surfactants, inorganic or organic salts, chelating agents, fragrances, pigments, dyes, and the like.

[0017]

The surfactant used to further improve the detergency includes one or more surfactants selected from amphoteric surfactants, cationic surfactants, anionic surfactants, and nonionic surfactants, preferably one or more surfactants selected from anionic surfactants and nonionic surfactants. The surfactants can be used alone or in combination of two or more types.

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[0018]

Examples of amphoteric surfactants include amine oxides such as alkyl dimethyl amine oxide, betaines such as alkyl dimethyl amino fatty acid betaines, alkyl carboxymethyl hydroxyethyl imidazolium betaines, and the like. Among these, alkyl dimethylamine oxides having an alkyl group with 8 to 18 carbon atoms are preferable. Furthermore, examples of cationic surfactants include primary amine salts, secondary amine salts, tertiary amine salts, and quaternary ammonium salts, but quaternary ammonium salts are particularly preferable among these. Examples of quaternary ammonium salts include compounds in which at least one of the four substituents is an alkyl or alkenyl group having a total of 8 to 28 carbon atoms, and the remainder are groups selected from a benzyl group, alkyl groups having 1 to 5 carbon atoms, and hydroxyalkyl groups having 1 to 5 carbon atoms. The alkyl or alkenyl group having a total of 8 to 28 carbon atoms may be substituted with an alkoxyl group, an alkenyloxy group, an alkanoylamino group, an alkenoylamino group, an alkanoyloxy group or an alkenoyloxy group within this carbon number range. The amount of the amphoteric surfactant and/or cationic surfactant blended in the composition is preferably 1 ppm to 5 wt%, more preferably 5 ppm to 1 wt%, and even more preferably 10 ppm to 0.5 wt%.

[0019]

In addition, it is preferable to add an anionic surfactant and a nonionic surfactant in order to improve the penetration into dirt and the foaming property. Examples of anionic surfactants include higher fatty acids, higher alcohol sulfate ester salts, higher alcohol sulfonates, sulfated fatty acid salts, sulfonated fatty acid salts, phosphate ester salts, sulfate ester salts of fatty acid esters, sulfonic acid ester salts of fatty acid esters, sulfate ester salts of higher alcohol ethers, acetates substitute with higher alcohol ethers, condensates of fatty acids and amino acids, alkylol sulfate salts of fatty acid amides, alkylated sulfonates of fatty acid amides, sulfosuccinate salts, alkylbenzene sulfonates, alkylphenol sulfonates, alkylnaphthalene sulfonates, alkylbenzimidazole sulfonates, amide ether carboxylic acids or salts thereof, ether carboxylic acids or salts thereof, N-acyl-N-methyl taurines or salts thereof, amide ether sulfuric acids or salts thereof, N-acyl glutamic acids or salts thereof,

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N-amidoethyl-N-hydroxyethyl acetic acids or salts thereof, acyloxyethanesulfonic acids or salts thereof, N-acyl-β-alanines or salts thereof, N-acyl-N-carboxyethyl taurines or salts thereof, N-acyl-N-carboxyethyl glycines or salts thereof, alkyl or alkenyl aminocarbonyl methyl sulfates, and the like. The amount of the anionic surfactant to be blended in the composition is preferably 1 ppm to 5 wt%, more preferably 10 ppm to 0.5 wt%, and even more preferably 50 ppm to 0.5 wt%.

[0020]

Examples of nonionic surfactants include monohydric alcohol derivative nonionic surfactants such as polyoxyethylene (hereinafter referred to as POE) alkyl ether, POE alkyl phenyl ether, polyoxypropylene-POE (block or random) alkyl ether, POE aryl phenyl ether, POE styrenated phenyl ether, and POE tribenzyl phenyl ether; and polyhydric alcohol derivative nonionic surfactants such as (poly)glycerin fatty acid esters, sucrose fatty acid esters, sorbitan fatty acid esters, alkyl polyglycosides, and the like. The amount of the nonionic surfactant in the composition is preferably 1 ppm to 5 wt%, more preferably 10 ppm to 1 wt%, and even more preferably 100 ppm to 0.5 wt%.

[0021]

In addition to being used as pH adjusters, salts are mainly used for the purpose of stabilizing disinfectants, and specific examples include: organic salts such as metal salts of carboxylates, such as succinic acid, malonic acid, citric acid, gluconic acid, and glutaric acid; metal salts of phosphate compounds, such as tripolyphosphate, hexametaphosphoric acid, and phosphoric acid; inorganic salts such as sulfates, such as sodium sulfate and potassium sulfate; and the like. These may be used alone or in combination of two or more types.

[0022]

The chelating agent includes ethylenediaminetetraacetic acid, nitrilotriacetic acid, tripolyphosphoric acid, polyhydroxyacrylic acid, organic phosphonic acid, and the like, or salts thereof.

[0023]

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In addition, the amount of water in the sterilizing cleaner composition for hard surfaces of the present invention is preferably 50 wt% or more but less than 100 wt%, more preferably 60 wt% or more but less than 100 wt%, and particularly preferably 70 wt% or more but less than 100 wt%. Furthermore, the sterilizing cleaner composition for hard surfaces of the present invention is an aqueous solution containing an organic peracid, and the concentration of the organic peracid in the composition is preferably 10 to 20,000 ppm, more preferably 10 to 10,000 ppm. In addition, in terms of sterilizing effect, it is preferable that the hydrogen peroxide content of the sterilizing cleaner composition for hard surfaces of the present invention is 0.5 wt% or less, more preferably 0.3 wt% or less, and even more preferably 0.2 wt% or less. This hydrogen peroxide content is preferably achieved immediately after preparation of the composition, and even more so at the time of use.

[0024]

In the present invention, from the perspective of stability, the weight ratio of the organic peracid to the surfactant is preferably 0.01 to 20, more preferably 0.1 to 10, and particularly preferably 0.5 to 5.

[0025]

The sterilizing cleaner composition for hard surfaces of the present invention has a high sterilizing effect and thus can be used to sterilize a variety of objects containing various microorganisms. Examples of bacteria include *Escherichia coli*, *Salmonella*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and the like that cause food poisoning and hospital-acquired infections, fungi such as *Aspergillus niger* and *Candida albicans*, and furthermore bacterial spores such as *Bacillus subtilis* and fungal spores such as *Aspergillus niger* that are highly resistant to disinfectants. Among these, bacterial spores are durable dormant cells that are produced in environments that are not suitable for bacterial growth, and have a multi-layered exoskeleton on the outside of the bacterial body. Such bacterial spores are highly resistant to chemicals and heat and are difficult to completely destroy using conventional sterilization methods. However, the

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sterilizing cleaner composition for hard surfaces of the present invention exhibits sufficient sterilization effect even against such bacterial spores.

[0026]

Thus, the sterilizing cleaner composition for hard surfaces of the present invention has a broad disinfecting spectrum and is highly effective not only against bacteria but also against fungi and spores, and is therefore useful for sterilizing and cleaning various hard surfaces.

[0027]

The sterilizing cleaner composition for hard surfaces of the present invention can be prepared from a composition for producing sterilizing cleaner as described below.

[0028]

(1) A composition for producing sterilizing cleaner, containing (A) an ester of a polyhydric alcohol and an organic acid having a hydrocarbon group which may have a hydroxyl group, and (B1) hydrogen peroxide, and having a water content of 1 to 25% by weight (hereinafter referred to as the first composition for producing sterilizing cleaner).

[0029]

(2) A composition for composition for producing sterilizing cleaner, containing (A) an ester of a polyhydric alcohol and an organic acid having a hydrocarbon group which may have a hydroxyl group, and (B1) hydrogen peroxide or (B2) an inorganic peroxide which releases hydrogen peroxide in water, with the molar ratio of (B1) produced from (A) and (B1) or (A) and (B2) being (A)/(B1) = 1/10 to 20/1, said composition for producing a sterilizing cleaner being used as an aqueous solution prepared by adjusting the pH to 8 to 12 and then adjusting the pH to 1 or more but less than 7 (hereinafter referred to as the second composition for producing sterilizing cleaner).

[0030]

(3) A composition for producing sterilizing cleaner obtained by mixing (A) an ester of a polyhydric alcohol and an organic acid having a hydrocarbon group which may have a hydroxyl group, and (B1) hydrogen peroxide or (B2) an inorganic peroxide that releases hydrogen peroxide in water, in a molar ratio of (A)/(B1) = 1/10 to 20/1 of (B1) produced from (A) and (B1) or (A)

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and (B2), said composition for producing sterilizing cleaner being used as an aqueous solution prepared by adjusting the pH to 8 to 12 and then adjusting the pH to 1 or more and less than 7 (hereinafter referred to as the third composition for producing sterilizing cleaner).

[0031]

Hereinafter, the inorganic peroxide that releases hydrogen peroxide in water (B2) will be referred to as component (B2), and the components (B1) and (B2) will be collectively described as component (B).

[0032]

In addition, the number of moles of hydrogen peroxide produced from component (B2) of component (B) is a value determined by multiplying the hydrogen peroxide concentration (wt%) in component (B2) determined by permanganate titration by the amount (g) of component (B2) in the composition, and dividing the result by 34, which is the molecular weight of hydrogen peroxide.

[0033]

<Component (B)>

In the component (B), the inorganic peroxide that releases hydrogen peroxide in the water of the component (B2) is preferably hydrogen peroxide when the composition for producing sterilizing cleaner is liquid, preferably percarbonate, perborate, and the like when the composition is granular, powdery, or the like, and particularly sodium percarbonate, sodium perborate, and the like when the composition is solid.

[0034]

<First Composition for Producing Sterilizing Cleaner>

The first composition for producing sterilizing cleaner of the present invention contains component (A) and component (B1), and in order to suppress reaction between component (A) and component (B1) during storage and maintain the stability of the composition, the moisture content of the composition is 1 to 25 wt%, preferably 5 to 20 wt%, and particularly preferably 5 to 15 wt%.

[0035]

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The first composition for producing sterilizing cleaner of the present invention is a single-liquid liquid composition containing components for obtaining an organic peracid. The amount of component (A) in the composition for producing sterilizing cleaner is preferably 20 to 90 wt%, further 30 to 90 wt%, and even more preferably 40 to 80 wt%, and the amount of component (B1) is preferably 1 to 30 wt%, more so 5 to 25 wt%, and even more preferably 10 to 25 wt%. The molar ratio of the component (A) to the component (B1), (A)/(B1), is preferably 1/10 to 20/1, more preferably 1/10 to 10/1, and even more preferably 1/5 to 10/1. Furthermore, the molar ratio of the component (B1) per ester group of the component (A) is preferably mole increased by a factor of 2 or less, and particularly preferably mole increased by a factor of 0.3 to 2, from the viewpoints of efficiently generating an organic peracid and reducing unreacted hydrogen peroxide.

[0036]

In addition, the first composition for producing sterilizing cleaner may contain a chelating agent, a pH adjuster, a solvent, and the like as necessary. Chelating agents are useful for suppressing catalytic decomposition caused by the inclusion of trace amounts of metal ions such as Fe and Cr. The pH (20°C) of the original solution of the first composition for producing sterilizing cleaner is preferably 0.5 to 6, more preferably 1 to 5, and particularly preferably 1 to 4, from the standpoint of storage stability. A compound having both a function as a pH adjuster and a function as a chelating agent is preferred, and specifically, phosphoric acid, polymerized phosphoric acid, organic phosphonic acid, aminocarboxylic acid, hydroxycarboxylic acid, or a salt thereof is preferable. Of these, an organic phosphonic acid or a salt thereof is preferable. As the solvent, a polyhydric alcohol solvent is preferable, and a glycol solvent such as propylene glycol is even more preferable.

[0037]

<Second Composition for Producing sterilizing cleaner>

The second composition for producing sterilizing cleaner of the present invention contains component (A) and component (B), and it is preferable that the ratio of the two is in a range in which component (B1) and component (A) react efficiently, and taking into consideration the

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efficiency of organic peracid generation, bactericidal effect, formulation stability, and the like, the molar ratio of component (A) to component (B1) is (A)/(B1) = 1/10 to 20/1, preferably 1/10 to 10/1, and more preferably 1/5 to 10/1. From the viewpoints of efficiently generating an organic peracid and reducing unreacted hydrogen peroxide, the molar ratio of component (B1) per ester group of component (A) is preferably 2 times as many moles or less, particularly preferably 0.3 to 2 times as many moles. When component (B2) is used, it is also preferable to compound such in an amount that generates component (B1) in the above range.

[0038]

Preferably, in addition to satisfying the molar ratio, the composition for producing the second sterilizing cleaner of the present invention contains 0.1 to 90 wt% component (A), more so 0.5 to 70 wt%, particularly 1 to 50 wt% component (B), and 0.1 to 50 wt% component (B1), preferably 0.1 to 30 wt%, and even more preferably 0.1 to 20 wt%.

[0039]

When using the second composition for producing sterilizing cleaner of the present invention, the aqueous solution that is the sterilizing cleaner composition is prepared by setting the pH to 8 to 12, preferably to 9 to 11 (first step), and then setting the pH to 1 or more and less than 7, preferably to 1 to 6, and more preferably to 1 to 5 (second step). In the first step, an alkaline pH adjusting agent is preferably used, and in the second step, an acidic pH adjusting agent is preferably used. This pH may be at the time of use, but preferably satisfies the above pH at 25°C. Note that the first composition for producing sterilizing cleaner of the present invention described above may also be used in the same manner.

[0040]

Examples of alkaline pH adjusting agents include alkali metal hydroxides such as sodium hydroxide, potassium hydroxide, calcium hydroxide, and barium hydroxide, alkaline earth metal hydroxides such as sodium silicate, alkali metal silicate such as potassium silicate, alkaline alkali metal salts such as trisodium phosphate, and alkali metal carbonates such as sodium carbonate and potassium carbonate, but from the perspective of alkalinity and water solubility, alkali metal

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hydroxides such as sodium hydroxide and potassium hydroxide, alkali metal salts such as trisodium phosphate and tripotassium phosphate, and alkali metal carbonate salts such as sodium carbonate and potassium carbonate and the like are preferable. Furthermore, examples of acidic pH adjusting agents include inorganic acids such as hydrochloric acid, sulfuric acid, and phosphoric acid and organic acids such as formic acid, acetic acid, citric acid, succinic acid, and gluconic acid, but from the perspective of acidity and water solubility, liquid inorganic acids such as sulfuric acid and phosphoric acid and highly water-soluble organic acids such as citric acid and acetic acid are preferable. These may be used alone or in combination of two or more types. Furthermore, these pH adjusting agents may remain present in the second composition for producing sterilizing cleaner of the present invention. Note that these pH adjusting agents may also be present in the first composition for producing sterilizing cleaner of the present invention described above.

[0041]

The second composition for producing sterilizing cleaner of the present invention may also contain, in addition to component (A) and component (B), surfactants, inorganic or organic salts, chelating agents, perfumes, pigments, dyes, and the like. Note that these components may also be present in the first composition for producing sterilizing cleaner of the present invention described above.

[0042]

The second composition for producing sterilizing cleaner of the present invention may take a variety of forms, but when in a liquid state, one with high fluidity is preferred, and in addition to an aqueous solution, a slurry, gel, paste, or the like with fluidity may also be used. Furthermore, in the case of a solid, examples of shapes include granules, powders, granules, pellets, and the like.

[0043]

The second composition for producing sterilizing cleaner of the present invention may package all of the blended components together, but from a perspective of stability, a multi-part form where component (A) and component (B) are packaged separately is preferable. For example, a three-part composition for producing sterilizing cleaner may be made from a package (1) of a

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composition containing component (A), a package (2) of a composition containing component (B), and a package (3) of a composition containing a pH adjusting agent (an acidic pH adjusting agent such as citric acid) for finally setting the pH to 1 or more and less than 7. In this case, it is preferable that an alkali agent is added to the package (2) and the mixture of the package (1) and the package (2) is adjusted so as to have a pH of 8 to 12. Furthermore, component (A) and component (B) may also be co-located in one package, particularly for a powder composition, and a two-part composition for producing sterilizing cleaner may be made from, for example, a package (I) of a composition containing component (A), component (B), and an alkali agent for adjusting the pH to 8 to 12, and a package (II) of a composition containing a pH adjusting agent (an acidic pH adjusting agent such as citric acid) for finally making the pH to be 1 or more and less than 7.

[0044]

In the second composition for producing sterilizing cleaner of the present invention, an aqueous solution that is a sterilizing cleaner composition containing organic peroxy acid is prepared by adjusting the pH value through the first step and second step above during use. The organic peroxy acid concentration in the aqueous solution is preferably 10 to 20,000 ppm (weight ratio, same as below) and more so 10 to 10,000 ppm. Furthermore, it is preferred that the hydrogen peroxide content in the aqueous solution be 0.5 wt% or less, more preferably 0.3 wt% or less, and particularly preferably 0.2 wt% or less, from the perspective of the sterilizing effect. These findings are similar to the first composition for producing sterilizing cleaner of the present invention described above.

[0045]

<Third Composition for Producing Sterilizing Cleaner>

The third composition for producing sterilizing cleaner of the present invention is obtained by blending component (A) and component (B) of the present invention, and similar to the second composition for producing sterilizing cleaner, the molar ratio of component (A) and component (B1) derived from component (B) is (A)/(B1) = 1/10 to 20/1, and after the pH is 8 to 12, it is used as an aqueous solution prepared with a pH of 1 or more but less than 7. The specific compounds

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of component (A) and component (B) and the preferred molar ratio of component (A)/(B1) are also similar to those of the second composition for producing sterilizing cleaner. Furthermore, the third composition for producing sterilizing cleaner may also contain the aforementioned surfactant, inorganic or organic salts, chelating agents, perfumes, pigments, dyes, and the like, and the packaging form may be the same.

[0046]

<Sterilizing Cleaner Kit>

A sterilizing cleaner kit suitable for obtaining the sterilizing cleaner composition for hard surfaces of the present invention is configured to contain the composition for producing sterilizing cleaner of the present invention, a reaction initiator (hereinafter referred to as component (C)) that initiates the reaction of component (A) and component (B1) brought about by the composition, and a pH adjusting agent (hereinafter referred to as component (D)). Furthermore, the sterilizing cleaner kit may also be configured to include component (A), component (B), component (C), and component (D).

[0047]

The sterilizing cleaner kit for obtaining the sterilizing cleaner composition for hard surfaces of the present invention may be a single-part form in which all of the formulated components are packaged together in consideration of the simplicity during organic peroxy acid production, but may be a multi-part form in which component (A), component (B), component (C), and component (D) are individually packaged in consideration of the stability during storage. A preferred form of the sterilizing cleaner kit is a multi-part form, such as a two-part form or a three-part form that includes a package in which a composition containing two or more components from among components (A) through (D) is packaged, in consideration of both convenience during organic peroxy acid production and storage stability of the composition for production.

[0048]

The component (A) and the component (B1) react under alkaline conditions (water temperature 5 to 50 is suitable) in water to generate an organic peroxy acid, and therefore, a component that

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gives such a pH may be used as the component (C). Specifically, examples include alkali metal hydroxides such as sodium hydroxide, potassium hydroxide, calcium hydroxide, and barium hydroxide, alkaline earth metal hydroxides, alkali metal silicate salts such as sodium silicate and potassium silicate, alkali metal phosphate salts that exhibit alkalinity, such as trisodium phosphate, and alkali metal carbonate salts such as sodium carbonate and potassium carbonate, which were given as examples of alkaline pH adjusting agents; however, from the perspective of alkalinity or water solubility, alkali metal hydroxides such as sodium hydroxide and potassium hydroxide, alkali metal phosphate salts such as trisodium phosphate and tripotassium carbonate and alkali metal carbonate salts such as sodium carbonate and potassium carbonate are preferable.

[0049]

On the other hand, it is preferable that the sterilizing cleaner containing organic peroxy acid use components that bring the pH that was in the alkaline region due to component (D) and component (C) into the acidic region, because it peroxy acids are preferable in terms of sterilizing effect. Specifically, examples include inorganic acids such as hydrochloric acid, sulfuric acid, and phosphoric acid and organic acids such as formic acid, acetic acid, citric acid, succinic acid, and gluconic acid, which were given as examples of acidic pH adjusting agents, but liquid inorganic acids such as sulfuric acid and phosphoric acid and highly water soluble organic acids such as citric acid and acetic acid are preferable from the perspective of acidity and water solubility.

[0050]

Specific forms of the sterilizing cleaner kit include:

(I) a form of three parts or more, including a package (X1) of a composition for producing sterilizing cleaner containing component (A) and component (B), a package (X2) of a composition containing component (C), and a package (X3) of a composition containing component (D),

(II) a form of three parts or more, including a package (Y1) of a composition containing component (A), a package (Y2) of a composition containing component (B) and component (C), and a package (X3) of a composition containing component (D), and

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(III) a form of two parts or more, including a package (Z1) of a composition containing component (A), component (B), and component (C) and a package (Z2) of a composition containing component (D).

[0051]

In the form of (I), the form of the composition for producing sterilizing cleaner is not limited to a powder, a solid, a liquid, or the like, but from the perspective of simplicity, liquid is more preferable. In order to suppress reaction between component (A) and component (B) during storage and maintain stability when the composition is in a liquid form, the water content in the liquid composition is preferably 1 to 25 wt%, more preferably 5 to 20 wt%, and even more preferably 5 to 15 wt%. Furthermore, as necessary, a chelating agent or a solvent may be added to the liquid composition. Chelating agents are useful for suppressing catalytic decomposition caused by the inclusion of trace amounts of metal ions such as Fe and Cr. Furthermore, the stock solution pH (20°C) of the liquid composition is preferably 0.5 to 6, more preferably 1 to 5, and even more preferably 1 to 4, in as this contributes to storage stability. As described above, it is preferable to use a component that acts both as a pH adjusting agent and as a chelating agent, and specifically, phosphoric acid, polymerized phosphoric acid, organic phosphonic acid, aminocarboxylic acid, hydroxycarboxylic acid, or a salt thereof is preferable. Of these, an organic phosphonic acid or a salt thereof is preferable. As the solvent, a polyhydric alcohol solvent is preferable, and a glycol solvent such as propylene glycol is even more preferable.

[0052]

Furthermore, when the composition for producing sterilizing cleaner in the form of (I) is a powder in solid form, sodium percarbonate, sodium perborate, or the like is preferably used as component (B). Similarly, from the perspective of storage stability, in the form of (II) and the form of (III) as well, the composition containing component (B) is also preferably in a solid form or powder in which sodium percarbonate, sodium perborate, or the like is used as component (B).

[0053]

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The amounts of components (A) through (D) in each of these forms may be selected within respective suitable ranges based on the method used for the first through third compositions for producing sterilizing cleaner of the present invention described above. Furthermore, components other than the components (A) through (D) may be added to any package containing the components (A) through (D), or added to another package.

[0054]

The composition for producing sterilizing cleaner and the sterilizing cleaner kit may be applied to a method for producing a sterilizing cleaner composition for hard surfaces, which has a step wherein an ester (A) of a polyhydric alcohol with an organic acid having a hydrocarbon group which may have a hydroxyl group and hydrogen peroxide (B1) are reacted with each other in water at a molar ratio of (A)/(B1) = 1/10 to 20/1 at a pH of 8 to 12, and then the reaction system is set at a pH of 1 or more but less than 7.

[0055]

The sterilizing cleaner composition for hard surfaces of the present invention is also suitable for systems that use automatic spray devices and spray guns. Furthermore, foam cleaning and sterilization using the addition of a foam increasing agent is also possible.

[Examples]

[0056]

Example 1

Below, % indicates wt%.

[0057]

<Preparation of Sterilizing Cleaner Composition (I)>

(A) 50 g of triacetin (made by Cognis Japan, active ingredient 100%) and (B) 25 g of hydrogen peroxide (made by Ube Chemira, active ingredient 60%) were mixed with 850 g of ion exchanged water, 75 g of an alkaline aqueous solution containing 27% sodium hydroxide and 1.3% of organic phosphonic acid (product name: Dequest 2010, made by Solucia) was poured in, and this was then mixed and stirred for 5 minutes. Afterward, 75 g of a mixed acid solution containing 30% sulfuric

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acid and 6% phosphoric acid was immediately added to prepare the sterilizing cleaner composition (I) containing the organic peroxy acid. The pH (25°C) of the composition (I) was about 2, and the hydrogen peroxide content was about 1500 ppm.

[0058]

<Preparation of Sterilizing Cleaner Composition (II)>

(A) 50 g of D-glucose-O-pentaacetate (reagent: made by Tokyo Chemical Industry Co., Ltd., active ingredient 100%) and 25 g of (B) 25 g of hydrogen peroxide (product of Ube Chemira Co., Ltd., active ingredient 60%) were mixed with 850 g of ion exchange water, and 75 g of an alkaline aqueous solution containing 27% sodium hydroxide and 1.3% of organic phosphonic acid (product name: Dequest 2010, product of Solucia Co., Ltd.) was poured in this solution, then mixed and stirred for 5 minutes. Afterward, 75 g of a mixed acid solution containing 30% sulfuric acid and 6% phosphoric acid was immediately added to prepare the sterilizing cleaner composition (II) containing the organic peroxy acid. The pH (25°C) of the composition (II) was about 2, and the hydrogen peroxide content was about 1500 ppm.

[0059]

<Measurement of Organic Peroxy Acid Concentration>

About 1 g of the sterilizing cleaner composition (I) or (II) prepared in a 100 mL beaker was weighed precisely, and approximately 50 mL of ion exchanged water and approximately 1 mL of a hydrogen peroxide decomposer (product name: Asksuper G, Mitsubishi Gas Chemical Co., Ltd.) were poured and stirred well to decompose only hydrogen peroxide in the composition. Afterward, 5 mL of 20% sulfuric acid and 5 mL of a 10% potassium iodide aqueous solution were poured, stirred, titrated using a 0.1 mol/L sodium thiosulfate aqueous solution, and an organic peroxy acid concentration (as peracetic acid concentration) was found using the following formula.

Organic peroxy acid (peracetic acid) concentration (%) = T × 38/W/100

T: Amount require for titration of 0.1 mol/L sodium thiosulfate aqueous solution (mL)

W: Collected amount of the sterilizing cleaner composition (g)

[0060]

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<Evaluation>

Evaluation tests of detergency and sterilizing power were performed by the following methods using a test aqueous solution where a composition obtained using the sterilizing cleaner compositions (I) and (II) and the components shown in Tables 1 and 2 were diluted with water so as to achieve the organic peroxy acid concentration in Tables 1 and 2. The results are shown in Tables 1 and 2. Note that, when there were no sterilizing solution components as a comparative control product of the sterilizing cleaner composition, a formulation that uses hydrogen peroxide, which is a typical oxygen based sterilizing solution, and sodium hypochlorite, which is a chlorine based sterilizing solution, was prepared, and the same evaluation test was performed.

[0061]

(1) Detergency Evaluation Test

After detergency model stains of oil stains and protein stains were prepared, each detergency was evaluated by a modified Leanut test method in accordance with JIS K-33629.2 Synthetic Dishwashing Cleaner Detergency Evaluation Methods.

[0062]

(1-1) Oil Stain Detergency Evaluation

20 g of oil and fat, 0.25 g of monoolein, and 0.1 g of oil red mixed with beef tallow and soybean oil at a 1:1 volume ratio, were dissolved in 60 mL of chloroform to prepare an oil stain solution. Sets of six clean slide glasses were each measured up to a mass of 1 mg. Glass slides were immersed about 55 mm in a 25±1°C oil stain solution one by one for about 2 seconds, and then removed after oil stain had adhered thereto. A mass of oil stain adhering to the lower part of the slide glass was sucked out by using a clean cloth such as gauze or filter paper, the adhesion of the oil stain was made uniform, this was air-dried as 25±1°C, and the mass was measured. Model dirty glass pieces were used for the test within 1 hour or more and 2 hours of air-drying time. In this case, the amount of oil stain adhered to the model dirty glass pieces per 6 sheets was made to be 0.140±0.010 g.

[0063]

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The 6 groups of model dirty glass pieces were washed for 5 minutes at 25±2°C using a modified Leanut washer and then rinsed with ion exchange water at 25±2°C for 30 seconds. The rinsed glass pieces were dried overnight. The evaluation of the detergency was calculated from the weight before and after washing the model dirty glass pieces. That is, the weight difference between before and after cleaning was found, and the cleaning rate (%) was calculated according to the following formula.

Cleaning rate (%) = ((Weight before cleaning - Weight after cleaning) / Amount of stain adhered)×100

The cleaning rates of each of the six glass pieces were found, and the average value of the four cleaning rates excluding the maximum value and the minimum value was the cleaning rate of the composition.

[0064]

(1-2) Protein Stain Detergency Evaluation

20 g of skim milk powder was diluted and dissolved in 60°C ion exchange water to make a total of 100 g, which was then used as a protein stain solution. Clean glass slides were each immersed about 55 mm in the protein stain solution at 25a1°C for about 2 seconds, and after adhering the protein stain, these were removed. The collection of protein stains adhering to the lower part of the slide glass was sucked out by using a clean cloth such as gauze or filter paper, the adhesion of the protein stain was made uniform, and this was air-dried at 25a1°C. This was repeated once again, and after the stain on one side had been completely removed, air drying was performed, and denaturation was performed for one hour at 110°C to make a test piece. This test piece was used for tests within 12 hours to 24 hours. The test piece was washed for 5 minutes at 25a2°C using a modified Leanut washer and then rinsed with ion-exchange water at 25a2°C for 30 seconds. After rinsing, the sample was dried at 70°C for 30 minutes, colored with an erythrosine 1 wt% solution, the colored area (S_1) was measured by a photographic determination, and the cleaning rate (%) was calculated from the protein stain adhered area (S_0) in the initial period (before cleaning) by the following formula.

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Cleaning rate (%) = $((S_0 - S_1) / S_0) \times 100$

The cleaning rates of each of the six glass pieces were found, and the average value of the four cleaning rates excluding the maximum value and the minimum value was the cleaning rate of the composition.

[0065]

(1-3) Oil Stain Detergency Evaluation Using Foam

20 g of oil and fat, 0.25 g of monoolein, and 0.1 g of oil red mixed with beef tallow and soybean oil at a 1:1 volume ratio, were dissolved in 60 mL of chloroform to prepare an oil stain solution. Each set of six clean slide glasses (76 mm × 26 mm × 1 mm) was measured at a mass up to 1 mg. Glass slides were immersed about 55 mm in a 25±1°C oil stain solution one by one for about 2 seconds, and then removed after oil stain had adhered thereto. A mass of oil stain adhering to the lower part of the slide glass was sucked out by using a clean cloth such as gauze or filter paper, the adhesion of the oil stain was made uniform, this was air-dried as 25±1°C, and the mass was measured. Model dirty glass pieces were used for the test within 1 hour or more and 2 hours of air-drying time. At this time, the sticking amount of oil stain per 6 sheets of model dirty glass pieces was set to 0.140±0.010 g.

[0066]

300 mL (25°C) of a test aqueous solution was placed in a 300 mL beaker, a silicone hose with an airs tone attached to the tip was immersed in the test solution, air was sent by an air pump (flow rate was 1.5 liters/minute), and bubbles were produced. Model dirty glass pieces were brought into contact with overflowing foam for five minutes one by one and rinsed with ion exchange water for 25a2°C30 seconds. The rinsed glass pieces were dried overnight. The evaluation of the detergency was calculated from the weight before and after washing the model dirty glass pieces. That is, the weight difference between before and after cleaning was found, and the cleaning rate (%) was calculated according to the following formula.

Cleaning rate (%) = ((Weight before cleaning - Weight after cleaning) / Amount of stain adhered)×100

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The cleaning rates of each of the six glass pieces were found, and the average value of the four cleaning rates excluding the maximum value and the minimum value was the cleaning rate of the composition.

[0067]

(2) Sterilizing Capacity Evaluation Test

After culturing *Bacillus subtilis* (ATCC6633), which is a spore-forming bacterium, in an SCD agar medium (made by Nihon Pharmaceutical Co., Ltd.) at about 30°C for approximately one week, the colonies formed on the agar medium were scraped, suspended in 1 mL of sterile water, and then the formation of bacterial spores (hereinafter referred to as spore) was confirmed by a microscope. After heat treatment at 65°C for 30 minutes, after performing two centrifuge washings, the bacterial concentration was adjusted to about 10^8 cell/mL using an appropriate amount of sterilized water. After preparing 1.0 mL of this spore fungus solution in the same manner as the detergency evaluation test described above in (1) and uniformly inoculating in one model dirty glass piece, air drying was performed to obtain glass pieces for a sterilization test.

[0068]

The glass piece for the sterilizing test was contacted for 5 minutes by bubbles in the test aqueous solution produced in a similar manner as item (1-3) of the detergency evaluation test (1) described above, and was quickly rinsed with sterilized water. Before the surface of the glass piece dried, a predetermined area (20 mm × 20 mm) of the glass piece was wiped off with a sterile cotton swab, and the cotton swab was immersed in 1 mL of sterile water (3.3% sodium thiosulfate added) and the adherend was suspended. 100 μL of the suspension was inoculated into a sterilized test tube containing 2.0mL of an SCD medium for post culture (made by Nippon Pharmaceutical Co., Ltd.). This was cultured for 48 hours at 35°C, growth of bacteria was observed with the naked eye, "○" was defined as a case where there was no growth of bacteria, and "×" was defined as a case where there was growth of bacteria.

[0069]

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[Table 1]

		Present invention							
		1	2	3	4	5	6	7	8
Test solution	Sterilizing cleaner composition (I)	2000ppm				1000ppm	1000ppm	1500ppm	3000ppm
	Sterilizing cleaner composition (II)		1500ppm	1500ppm	1000ppm				
	Hydrogen peroxide								
	Sodium hypochlorite								
	Sodium polyoxyethylene laurylether sulfate[1]	500ppm		1000ppm			500ppm		
	Lauryldimethylamine oxide[2]				200ppm				
	Benzalkonium chloride[3]					100ppm			
	Alkyl polyglycosides[4]		1000ppm		500ppm	1000ppm	300ppm		
	Polyoxyethylene lauryl ether[5]							1000ppm	
Evaluation	(1-1) Oil stain cleaning rate (%)	59	62	60	56	63	61	58	41
	(1-2) Protein stain cleaning rate (%)	60	60	59	58	61	60	59	40
	(1-3) Oil stain cleaning rate (%)	56	58	58	57	58	57	58	41
	Sterilization power	○	○	○	○	○	○	○	○

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[0070]

[Table 2]

		Comparison product							
		1	2	3	4	5	6	7	8
Test solution	Sterilizing cleaner composition (I)								
	Sterilizing cleaner composition (II)								
	Hydrogen peroxide					1.0%	1.0%		
	Sodium hypochlorite							400ppm	200ppm
	Sodium polyoxyethylene lauryl ether sulfate [1]	500ppm		1000ppm			500ppm		
	Lauryl dimethylamine oxide [2]				200ppm				200ppm
	Benzalkonium chloride [3]					100ppm			
	Alkyl polyglycosides [4]		1000ppm		500ppm	1000ppm	300ppm		500ppm
	Polyoxyethylene lauryl ether [5]							1000ppm	
Evaluation	(1-1) Oil stain cleaning rate (%)	56	58	55	54	64	60	59	44
	(1-2)Protein stain cleaning rate (%)	56	51	50	55	60	60	64	53
	(1-3) Oil stain cleaning rate (%)	51	55	57	52	58	52	57	45
	Sterilization power	×	×	×	×	×	×	×	×

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[0071]

The hydrogen peroxide concentration in the table indicates the hydrogen peroxide effective content concentration, and the sodium hypochlorite concentration indicates the effective chlorine concentration. Furthermore, the surfactant is as follows.

(1): The active ingredient concentration was determined to be the numerical value in Table 1 using Emal 20C (made by Kao Corp., active ingredient 25%).

(2): The active ingredient concentration was determined to be the numerical value in Table 1 using Anhitor 20N (made by Kao Corp., active ingredient 35%).

(3): The active ingredient concentration was determined to be the numerical value in Table 1 using Sanizor C (made by Kao Corp., active ingredient 50%).

(4): The active ingredient concentration was determined to be the numerical value in Table 1 using Midol 12 (made by Kao Corp., active ingredient 40%).

(5): The active ingredient concentration was determined to be the numerical value in Table 1 using Emulgen 106 (made by Kao Corp., active ingredient 100%).

[Procedural Amendment]

[Date Submitted] August 4, 2005 (Heisei 17)

[Procedural Amendment 1]

[Document to Be Amended] Specification

[Name of Item to Be Amended] 0064

[Amendment Method] Change

[Content of Amendment]

[0064]

(1-2) Protein Stain Detergency Evaluation

20 g of skim milk powder was diluted and dissolved in 60°C ion exchange water to make a total of 100 g, which was then used as a protein stain solution. A clean slide glass was immersed in a protein stain solution at 25±1°C for about 2 seconds at approximately 55mm each, and after adhering the protein stain, this was removed. The collection of protein stains adhering to the lower

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part of the slide glass is sucked out by using a clean cloth such as gauze or filter paper, the adhesion of the protein stain was made uniform, and this was air-dried at 25±1°C. This was repeated once again, and after the stain on one side had been completely removed, air drying was performed, and denaturation was performed for one hour at 110°C to make a test piece. This test piece was used for tests within 12 hours to 24 hours. The test piece was washed for 5 minutes at 25±2°C using a modified Leanut washer and then rinsed with ion-exchange water at 25±2°C for 30 seconds. After rinsing, the sample was dried at 70°C for 30 minutes, colored with an erythrosine 1 wt% solution, the colored area (S_1) was measured by a photographic determination, and the cleaning rate (%) was calculated from the protein stain adhered area (S_0) in the initial period (before cleaning) by the following formula.

Cleaning rate (%) = $((S_0 - S_1) / S_0) \times 100$

The cleaning rates of each of the six glass pieces were found, and the average value of the four cleaning rates excluding the maximum value and the minimum value was the cleaning rate of the composition.

[Procedural Amendment 2]

[Document to Be Amended] Specification

[Name of Item to be Amended] 0065

[Amendment Method] Change

[Content of Amendment]

[0065]

(1-3) Oil Stain Detergency Evaluation Using Foam

20 g of oil and fat, 0.25 g of monoolein, and 0.1 g of oil red mixed with beef tallow and soybean oil at a 1:1 volume ratio, were dissolved in 60 mL of chloroform to prepare an oil stain solution. Each set of six clean slide glasses (76 mm × 26 mm × 1 mm) was measured at a mass up to 1 mg. Glass slides were immersed about 55 mm in a 25±1°C oil stain solution one by one for about 2 seconds, and then removed after oil stain had adhered thereto. A mass of oil stain adhering to the lower part of the slide glass was sucked out by using a clean cloth such as gauze or filter paper, the

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adhesion of the oil stain was made uniform, this was air-dried as 25±1°C, and the mass was measured. Model dirty glass pieces were used for the test within 1 hour or more and 2 hours of air-drying time. In this case, the amount of oil stain adhered to the model dirty glass pieces per 6 sheets was made to be 0.140±0.010 g.

[Procedural Amendment 3]

[Document to Be Amended] Specification

[Name of Item to Be Amended] 0066

[Amendment Method] Change

[Content of Amendment]

[0066]

300 mL (25°C) of a test aqueous solution was placed in a 300 mL beaker, a silicone hose with an airs tone attached to the tip was immersed in the test solution, air was sent by an air pump (flow rate was 1.5 liters/minute), and bubbles were produced. Model dirty glass pieces were brought into contact with overflowing foam for five minutes one by one and rinsed with ion exchange water at 25±2°C for 30 seconds. The rinsed glass pieces were dried overnight. The evaluation of the detergency was calculated from the weight before and after washing the model dirty glass pieces. That is, the weight difference between before and after cleaning was found, and the cleaning rate (%) was calculated according to the following formula.

Cleaning rate (%) = ((Weight before cleaning - Weight after cleaning) / Amount of stain adhered)×100

The cleaning rates of each of the six glass pieces were found, and the average value of the four cleaning rates excluding the maximum value and the minimum value was the cleaning rate of the composition.

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	DA13	DF06	DH03	DH10						

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CERTIFICATION STATEMENT FOR TRANSLATION

OF JP 2006-045147 A

I, Eric Vance, hereby certify as follows:

1. I am proficient in both English and Japanese and am qualified to translate documents from Japanese into English.

2. My qualifications include a baccalaureate degree in Japanese and 8 years of experience translating patents from Japanese into English.

3. I am employed by Park IP Translations, a subsidiary of Welocalize, Inc., and have a business address at:

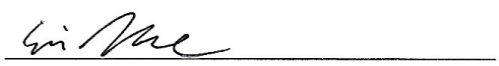
   2042 E Summerridge Dr., Meridian, ID 8646, USA.

4. I prepared the accompanying translation of JP 2006-045147 from Japanese into English to the best of my ability.

5. Upon information and belief, the accompanying translation of JP 2006-045147 from Japanese into English is true and correct.

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Translator's Name: Eric Vance

Signature: 

Date: February 5, 2025

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(54)【発明の名称】硬質表面用殺菌洗浄剤組成物

(57)【要約】
【課題】　芽胞形成菌やカビに対して高い殺菌効果を示す硬質表面用殺菌洗浄剤組成物を提供する。
【解決手段】　（Ａ）多価アルコールと有機酸とのエステルと（Ｂ１）過酸化水素とを、水中で特定のモル比で、且つｐＨ８～１２で反応させて得られた有機過酸、並びに水を含有し、２５℃におけるｐＨが１以上７未満である硬質表面用殺菌洗浄剤組成物。
【選択図】　なし

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【特許請求の範囲】
【請求項1】
（Ａ）多価アルコールと水酸基を有していても良い炭化水素基を有する有機酸とのエステルと（Ｂ１）過酸化水素とを、水中で、（Ａ）／（Ｂ１）＝１／１０～２０／１のモル比で、且つｐＨ８～１２で反応させて得られた有機過酸、並びに水を含有し、２５℃におけるｐＨが１以上７未満である硬質表面用殺菌洗浄剤組成物。
【請求項2】
過酸化水素含有量が０．５重量%以下である請求項１記載の硬質表面用殺菌洗浄剤組成物。
【請求項3】
（Ａ）を構成する有機酸が、炭素数１～８の脂肪酸である請求項１又は２記載の硬質表面用殺菌洗浄剤組成物。
【請求項4】
更に界面活性剤を含有する請求項１～３の何れか１項記載の硬質表面用殺菌洗浄剤組成物。
【請求項5】
界面活性剤が、陰イオン界面活性剤及び非イオン界面活性剤から選ばれる１種以上である請求項４記載の硬質表面用殺菌洗浄剤組成物。
【請求項6】
（Ａ）多価アルコールと水酸基を有していても良い炭化水素基を有する有機酸とのエステルと（Ｂ１）過酸化水素とを、（Ａ）／（Ｂ１）＝１／１０～２０／１のモル比で、水中でｐＨ８～１２で反応させ、次いで当該反応系をｐＨ１以上７未満とする工程を有する、硬質表面用殺菌洗浄剤組成物の製造方法。

【発明の詳細な説明】
【技術分野】
【0001】
本発明は、プラスチック、金属、ガラス、タイル等の硬質表面の殺菌洗浄に適した硬質表面用殺菌洗浄剤組成物に関する。
【背景技術】
【0002】
食品製造工場、医薬品製造工場、病院、養護施設や、厨房、トイレ等、衛生的な環境が望まれる施設は多い。これらにおいて、衛生的な環境を維持するためには、床、壁等や使用器具等のこまめな殺菌処理が不可欠である。
【0003】
これらの硬質表面の殺菌や洗浄には、界面活性剤や殺菌剤等を配合した液体あるいは粉末の洗浄剤、殺菌剤、殺菌洗浄剤が主に使用されている。そして、工業的な製造プロセスに殺菌洗浄工程を組み込む場合は、有効成分の供給、混合、適用（塗布、噴霧等）等の工程が自動化されている場合が多い。
【0004】
こうした硬質表面の殺菌洗浄に用いられる殺菌洗浄剤として、塩素系の殺菌剤を含むものが知られている。例えば、特許文献１には、次亜塩素酸塩、両性界面活性剤及び／又は陽イオン界面活性剤、ｐＨ調整剤を含有する硬質表面用殺菌洗浄剤組成物が開示されている。また、特許文献２には、特定の長鎖アミンオキサイド混合物を含む水性組成物に、次亜塩素酸塩を使用できることが開示されている。
【特許文献1】特開２００１－３４２４９６号
【特許文献2】特表平９－５００６８０号
【発明の開示】
【発明が解決しようとする課題】
【0005】
しかしながら、従来の硬質表面用の殺菌洗浄剤は、殺菌しにくい芽胞菌の形成する芽胞

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や、カビに対しての殺菌効果が低く、十分な殺菌洗浄効果を得るにはかなりの高温・長時間の処理が必要であった。食品加工工場や病院等では、床、壁、設備、器具等の硬質表面は、微生物汚染が生じやすいため、こうした硬質表面の十分な殺菌洗浄は重要である。

【0006】

酸素系殺菌剤を用いた硬質表面用殺菌剤組成物は、環境への影響が穏和である点では有利であるが、細菌芽胞などの薬剤耐性の強い微生物に対する殺菌効果については、更なる向上が望まれる。芽胞形成菌に対しては、過酢酸を含む殺菌剤がある程度の効果を示すことは知られているが、臭気の点で使いにくく、作業環境は不良となる等の問題がある。

【0007】

本発明の課題は、芽胞形成菌等、薬剤耐性の高い微生物に対してもより高い殺菌効果を示す、酸素系の硬質表面用殺菌洗浄剤組成物を提供することである。

【課題を解決するための手段】

【0008】

本発明は、（Ａ）多価アルコールと水酸基を有していても良い炭化水素基を有する有機酸とのエステル〔以下、（Ａ）成分という〕と（Ｂ１）過酸化水素〔以下、（Ｂ１）成分という〕とを、水中で、（Ａ）／（Ｂ１）＝１／１０～２０／１のモル比で、且つｐＨ８～１２で反応させて得られた有機過酸、並びに水を含有し、２５℃におけるｐＨが１以上７未満である硬質表面用殺菌洗浄剤組成物に関する。

【0009】

また、本発明は、（Ａ）多価アルコールと水酸基を有していても良い炭化水素基を有する有機酸とのエステルと（Ｂ１）過酸化水素とを、（Ａ）／（Ｂ１）＝１／１０～２０／１のモル比で、水中でｐＨ８～１２で反応させ、次いで当該反応系をｐＨ１以上７未満とする工程を有する、硬質表面用殺菌洗浄剤組成物の製造方法に関する。

【発明の効果】

【0010】

本発明によれば、硬質表面に対して優れた洗浄力を示し、且つ、通常の操作よりも低温、短時間の処理でも芽胞やカビに対して優れた殺菌力を示す硬質表面用殺菌洗浄剤組成物が得られる。また、本発明の組成物は、臭気の問題もなく、作業環境への影響も少ない。

【発明を実施するための最良の形態】

【0011】

＜（Ａ）成分＞

（Ａ）成分の多価アルコールと水酸基を有していても良い炭化水素基を有する有機酸とのエステルは、過酸化水素と反応して有機過酸を生じるものである。

【0012】

（Ａ）成分を構成するための多価アルコールとしては、炭素数２～１２のものが好ましく、グリセリン、ジグリセリン、トリグリセリン等のグリセリン類、グルコース、ショ糖、果糖、ソルビトール、ペンタエリスリトール、アルキルポリグリコシド、アルキルフラノシド等の糖類が挙げられる。

【0013】

また、（Ａ）成分を構成するための有機酸としては、酢酸、プロピオン酸、酪酸、吉草酸、カプロン酸、オクタン酸等の脂肪族モノカルボン酸、シュウ酸、マロン酸、コハク酸、マレイン酸、フマル酸等の脂肪族ジカルボン酸、クエン酸、酒石酸、リンゴ酸等の水酸基を有するヒドロキシカルボン酸等が挙げられるが、好ましくは炭素数１～８の飽和又は不飽和の脂肪族モノ又はジカルボン酸が挙げられ、より好ましくは炭素数１～８の飽和又は不飽和の脂肪族モノカルボン酸が挙げられ、更に好ましくは炭素数１～８の脂肪酸が挙げられ、特に好ましくは炭素数２～８の脂肪酸が挙げられる。（Ａ）成分のエステル化度は限定されない。

【0014】

具体的な（Ａ）成分としては、グリセリンと炭素数１～８の脂肪族モノカルボン酸のエステルが好ましく、なかでもトリアセチンが好ましい。

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【0015】
本発明の硬質表面用殺菌洗浄剤組成物は、（Ａ）成分と（Ｂ１）成分とを、水中で、（Ａ）／（Ｂ１）＝１／１０～２０／１のモル比で、且つｐＨ８～１２で反応させて得られた有機過酸、並びに水を含有し、２５℃におけるｐＨが１以上７未満のものである。すなわち、本発明の硬質表面用殺菌洗浄剤組成物は、上記の通り、（Ａ）成分と（Ｂ１）成分とを、水中で、特定のモル比で、且つｐＨ８～１２で反応させ、次いでｐＨを１以上７未満、好ましくは１～６、より好ましくは１～５に調整してなるものである。
【0016】
本発明の硬質表面用殺菌洗浄剤組成物は、（Ａ）成分、（Ｂ１）成分以外にも、界面活性剤、無機又は有機の塩類、キレート剤、香料、顔料、染料等を含有することができる。
【0017】
更なる洗浄力の向上のために用いられる界面活性剤としては、両性界面活性剤、陽イオン界面活性剤、陰イオン界面活性剤及び非イオン界面活性剤から選ばれる１種以上の界面活性剤が挙げられ、陰イオン界面活性剤及び非イオン界面活性剤から選ばれる１種以上が好ましい。界面活性剤は単独であるいは２種以上を組み合わせて用いることができる。
【0018】
両性界面活性剤としては、アルキルジメチルアミンオキシド等のアミンオキシド、アルキルジメチルアミノ脂肪酸ベタイン、アルキルカルボキシメチルヒドロキシエチルイミダゾリウムベタイン等のベタインなどが挙げられる。なかでも、炭素数８～１８のアルキル基を有するアルキルジメチルアミンオキシドが好ましい。また、陽イオン界面活性剤としては、第１級アミン塩、第２級アミン塩、第３級アミン塩、第４級アンモニウム塩が挙げられるが、このうち第４級アンモニウム塩が特に好ましい。第４級アンモニウム塩としては、４つの置換基の少なくとも１つが総炭素数８～２８のアルキル又はアルケニル基であり、残余がベンジル基、炭素数１～５のアルキル基及び炭素数１～５のヒドロキシアルキル基から選ばれる基である化合物が挙げられる。総炭素数８～２８のアルキル又はアルケニル基は、この炭素数の範囲で、アルコキシル基、アルケニルオキシ基、アルカノイルアミノ基、アルケノイルアミノ基、アルカノイルオキシ基又はアルケノイルオキシ基で置換されていてもよい。両性界面活性剤及び／又は陽イオン界面活性剤の配合量は、組成物中に１ｐｐｍ～５重量％、更に５ｐｐｍ～１重量％、特に１０ｐｐｍ～０．５重量％が好ましい。
【0019】
また、陰イオン界面活性剤及び非イオン界面活性剤は汚れに対する浸透性向上や泡立ち性向上のために配合することが好ましい。陰イオン界面活性剤としては、高級脂肪酸塩、高級アルコール硫酸エステル塩、高級アルコールスルホン酸塩、硫酸化脂肪酸塩、スルホン化脂肪酸塩、リン酸エステル塩、脂肪酸エステルの硫酸エステル塩、脂肪酸エステルのスルホン酸エステル塩、高級アルコールエーテルの硫酸エステル塩、高級アルコールエーテルのスルホン酸エステル塩、高級アルコールエーテル置換の酢酸塩、脂肪酸とアミノ酸の縮合物、脂肪酸アミドのアルキロール化硫酸エステル塩、脂肪酸アミドのアルキル化スルホン酸塩、スルホコハク酸エステル塩、アルキルベンゼンスルホン酸塩、アルキルフェノールスルホン酸塩、アルキルナフタレンスルホン酸塩、アルキルベンゾイミダゾールスルホン酸塩、アミドエーテルカルボン酸又はその塩、エーテルカルボン酸又はその塩、Ｎ－アシル－Ｎ－メチルタウリン又はその塩、アミドエーテル硫酸又はその塩、Ｎ－アシルグルタミン酸又はその塩、Ｎ－アミドエチル－Ｎ－ヒドロキシエチル酢酸又はその塩、アシルオキシエタンスルホン酸又はその塩、Ｎ－アシル－β－アラニン又はその塩、Ｎ－アシル－Ｎ－カルボキシエチルタウリン又はその塩、Ｎ－アシル－Ｎ－カルボキシエチルグリシン又はその塩、及びアルキル又はアルケニルアミノカルボニルメチル硫酸又はその塩等が挙げられる。陰イオン界面活性剤の配合量は、組成物中に１ｐｐｍ～５重量％、更に１０ｐｐｍ～０．５重量％、特に５０ｐｐｍ～０．５重量％が好ましい。
【0020】
また、非イオン界面活性剤としては、ポリオキシエチレン（以下、ＰＯＥと記す）アル

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キルエーテル、ＰＯＥアルキルフェニルエーテル、ポリオキシプロピレン・ＰＯＥ（ブロック又はランダム）アルキルエーテル、ＰＯＥアリールフェニルエーテル、ＰＯＥスチレン化フェニルエーテル、ＰＯＥトリベンジルフェニルエーテル等の１価アルコール誘導体型非イオン性界面活性剤；（ポリ）グリセリン脂肪酸エステル、ショ糖脂肪酸エステル、ソルビタン脂肪酸エステル、アルキルポリグリコシド等の多価アルコール誘導体型非イオン性界面活性剤等が挙げられる。非イオン界面活性剤の配合量は、組成物中に１ｐｐｍ～５重量％、更に１０ｐｐｍ～１重量％、特に１００ｐｐｍ～０．５重量％が好ましい。

【0021】

塩類は、ｐＨ調整剤として用いられる他に、主として殺菌薬剤の安定化の目的で用いられ、具体的には、コハク酸、マロン酸、クエン酸、グルコン酸、グルタル酸等のカルボン酸金属塩等の有機塩、トリポリリン酸、ヘキサメタリン酸、リン酸等のリン酸化合物金属塩、硫酸ナトリウム、硫酸カリウム等の硫酸塩等の無機塩が挙げられる。これらは単独であるいは２種以上を組み合わせて用いることができる。

【0022】

キレート剤としては、エチレンジアミン四酢酸、ニトリロトリ酢酸、トリポリリン酸、ポリヒドロキシアクリル酸、有機ホスホン酸等又はこれらの塩が挙げられる。

【0023】

また、本発明の硬質表面用殺菌洗浄剤組成物中の水の量は、組成物中、５０重量％以上１００重量％未満、更に６０重量％以上１００重量％未満、特に７０重量％以上１００重量％未満が好ましい。また、本発明の硬質表面用殺菌洗浄剤組成物は有機過酸を含有する水溶液であり、当該組成物中の有機過酸濃度は、１０～２０，０００ｐｐｍ、更に１０～１０，０００ｐｐｍであることが好ましい。また、本発明の硬質表面用殺菌洗浄剤組成物は、過酸化水素含有量が０．５重量％以下、更に０．３重量％以下、特に０．２重量％以下であることが、殺菌効果の点で好ましい。この過酸化水素含有量は、当該組成物の調製直後、更には使用時に達成されることが好ましい。

【0024】

本発明において、有機過酸と界面活性剤の重量比は、安定性の観点から、界面活性剤／有機過酸＝０．０１～２０が好ましく、０．１～１０がより好ましく、０．５～５が特に好ましい。

【0025】

本発明の硬質表面用殺菌洗浄剤組成物は、高い殺菌効果を有するために、種々の微生物が存在する様々な被殺菌物を殺菌対象とすることができる。例えば、細菌類では大腸菌、サルモネラ菌、黄色ブドウ球菌、緑濃菌等の食中毒や院内感染等の起因菌、黒コウジカビ、カンジダ菌等の真菌類、更には殺菌剤に強い耐性を有する枯草菌等の細菌芽胞や黒コウジカビ等の真菌胞子が挙げられる。このうち、細菌芽胞とは、増殖に適さない環境において作られる耐久性を有する休眠細胞であり、菌体の外側には多重の層状外殻を有している。このような細菌芽胞は薬剤や熱などに対する耐久性が非常に高く、一般的な殺菌では完全に死滅させることは困難である。しかし、本発明の硬質表面用殺菌洗浄剤組成物によれば、このような細菌芽胞に対しても十分な殺菌効果が得られる。

【0026】

このように、本発明の硬質表面用殺菌洗浄剤組成物は、殺菌スペクトルが広く、細菌類のみならず、真菌類や芽胞に対する効果も高いため、種々の硬質表面に対する殺菌洗浄に有用である。

【0027】

本発明の硬質表面用殺菌洗浄剤組成物は、以下のような殺菌洗浄剤製造用組成物から調製することができる。

【0028】

（１）（Ａ）多価アルコールと水酸基を有していても良い炭化水素基を有する有機酸とのエステル及び（Ｂ１）過酸化水素を含有し、水分含有量が１～２５重量％である殺菌洗浄剤製造用組成物（以下、第１の殺菌洗浄剤製造用組成物という）。

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【0029】
（２）（Ａ）多価アルコールと水酸基を有していても良い炭化水素基を有する有機酸とのエステル、及び（Ｂ１）過酸化水素又は（Ｂ２）水中で過酸化水素を放出する無機過酸化物を、（Ａ）と（Ｂ１）又は（Ａ）と（Ｂ２）から発生する（Ｂ１）のモル比が（Ａ）／（Ｂ１）＝１／１０～２０／１で含有する殺菌洗浄剤製造用組成物であって、ｐＨを８～１２とした後、ｐＨを１以上７未満として調製された水溶液として用いられる殺菌洗浄剤製造用組成物（以下、第２の殺菌洗浄剤製造用組成物という）。
【0030】
（３）（Ａ）多価アルコールと水酸基を有していても良い炭化水素基を有する有機酸とのエステル、及び（Ｂ１）過酸化水素又は（Ｂ２）水中で過酸化水素を放出する無機過酸化物を、（Ａ）と（Ｂ１）又は（Ａ）と（Ｂ２）から発生する（Ｂ１）のモル比が（Ａ）／（Ｂ１）＝１／１０～２０／１で配合して得られる殺菌洗浄剤製造用組成物であって、ｐＨを８～１２とした後、ｐＨを１以上７未満として調製された水溶液として用いられる殺菌洗浄剤製造用組成物（以下、第３の殺菌洗浄剤製造用組成物という）。
【0031】
以下、（Ｂ２）水中で過酸化水素を放出する無機過酸化物を（Ｂ２）成分とし、（Ｂ１）成分と（Ｂ２）成分を合わせて（Ｂ）成分として説明する。
【0032】
なお、（Ｂ）成分のうち、（Ｂ２）成分から発生する過酸化水素のモル数とは、過マンガン酸滴定法により求められる（Ｂ２）成分中の過酸化水素濃度（重量％）に、組成物中の（Ｂ２）成分の配合量（ｇ）を乗じて、過酸化水素の分子量である３４で除することにより求められる値である。
【0033】
＜（Ｂ）成分＞
（Ｂ）成分うち、（Ｂ２）成分の水中で過酸化水素を放出する無機過酸化物は、殺菌洗浄剤製造用組成物が液状の場合は過酸化水素が、粒状、粉状等、固体状の場合は、過炭酸塩、過ホウ酸塩が好ましく、特に過炭酸ナトリウム、過ホウ酸ナトリウムが好ましい。
【0034】
＜第１の殺菌洗浄剤製造用組成物＞
本発明の第１の殺菌洗浄剤製造用組成物は、（Ａ）成分と（Ｂ１）成分とを含有するが、貯蔵中の（Ａ）成分と（Ｂ１）成分の反応を抑制して組成物の安定性を維持する点から、組成物中の水分含有量は１～２５重量％であり、更に５～２０重量％、特に５～１５重量％が好ましい。
【0035】
本発明の第１の殺菌洗浄剤製造用組成物は、有機過酸を得るための成分を含有する１液型の液状組成物である。第１の殺菌洗浄剤製造用組成物中の（Ａ）成分の含有量は、２０～９０重量％、更に３０～９０重量％、特に４０～８０重量％が好ましく、（Ｂ１）成分の含有量は、１～３０重量％、更に５～２５重量％、特に１０～２５重量％が好ましい。また、（Ａ）成分と（Ｂ１）成分のモル比は、（Ａ）／（Ｂ１）＝１／１０～２０／１、更に１／１０～１０／１、特に１／５～１０／１であることが好ましい。また、（Ａ）成分のエステル基１個あたりの（Ｂ１）成分のモル比は、効率的に有機過酸を生成し、かつ未反応の過酸化水素を低減させる観点から、２倍モル以下が好ましく、特に０．３～２倍モルが好ましい。
【0036】
また、第１の殺菌洗浄剤製造用組成物は、必要に応じて、キレート剤、ｐＨ調整剤、溶剤等を含有することができる。ＦｅやＣｒ等の金属イオンの微量混入による触媒的分解を抑制するためにキレート剤は有用である。第１の殺菌洗浄剤製造用組成物の原液ｐＨ（２０℃）は、貯蔵安定性の点から、０．５～６が好ましく、さらに１～５が好ましく、特に１～４が好ましい。ｐＨ調整剤としての作用とキレート剤としての作用を兼ね備えたものが好ましく、具体的には、リン酸、重合リン酸、有機ホスホン酸、アミノカルボン酸、ヒ

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ドロキシカルボン酸、若しくはこれらの塩が好ましい。中でも、有機ホスホン酸若しくはその塩が好ましい。溶剤としては、多価アルコール溶剤が好ましく、プロピレングリコール等のグリコール溶剤が特に好ましい。

【0037】

＜第２の殺菌洗浄剤製造用組成物＞

本発明の第２の殺菌洗浄剤製造用組成物は、（Ａ）成分と（Ｂ）成分を含有するが、両者の比率は、（Ｂ１）成分と（Ａ）成分が効率的に反応する範囲であることが好ましく、有機過酸生成効率、殺菌効果、製剤安定性等を考慮すると、（Ａ）成分と（Ｂ１）成分とのモル比が、（Ａ）／（Ｂ１）＝１／１０～２０／１であり、１／１０～１０／１、更に１／５～１０／１であることが好ましい。また、（Ａ）成分のエステル基１個あたりの（Ｂ１）成分のモル比は、効率的に有機過酸を生成し、かつ未反応の過酸化水素を低減させる観点から、２倍モル以下が好ましく、特に０．３～２倍モルが好ましい。（Ｂ２）成分を用いる場合も、上記範囲の（Ｂ１）成分を発生する量で配合することが好ましい。

【0038】

好ましくはこのモル比を満たした上で、本発明の第２の殺菌洗浄剤製造用組成物は、（Ａ）成分を０．１～９０重量％、更に０．５～７０重量％、特に１～５０重量％、（Ｂ）成分を、（Ｂ１）成分として、０．１～５０重量％、更に０．１～３０重量％、特に０．１～２０重量％含有することが好ましい。

【0039】

本発明の第２の殺菌洗浄剤製造用組成物は、使用時には、ｐＨを８～１２、好ましくは９～１１とし（第一工程）、次いでｐＨ１以上７未満、好ましくは１～６、より好ましくは１～５とすることで（第二工程）、殺菌洗浄剤組成物である水溶液が調製される。第一工程では、アルカリ性のｐＨ調整剤を、第二工程では酸性のｐＨ調整剤を用いるのが好ましい。このｐＨは、使用時のものでよいが、好ましくは２５℃において上記ｐＨを満たすことである。なお、上記した本発明の第１の殺菌洗浄剤製造用組成物も同様に使用することができる。

【0040】

アルカリ性のｐＨ調整剤としては、水酸化ナトリウム、水酸化カリウム、水酸化カルシウム、水酸化バリウム等のアルカリ金属水酸化物又はアルカリ土類金属水酸化物、ケイ酸ナトリウム、ケイ酸カリウム等のケイ酸アルカリ金属塩、リン酸３ナトリウム等のアルカリ性を呈するリン酸アルカリ金属塩、炭酸ナトリウム、炭酸カリウム等の炭酸アルカリ金属塩が挙げられるが、アルカリ度や水溶性の観点より水酸化ナトリウムや水酸化カリウム等のアルカリ金属水酸化物、リン酸３ナトリウムやリン酸３カリウム等のリン酸アルカリ金属塩、炭酸ナトリウムや炭酸カリウム等の炭酸アルカリ金属塩が好ましい。また、酸性のｐＨ調整剤としては、塩酸、硫酸、リン酸等の無機酸、ギ酸、酢酸、クエン酸、コハク酸、グルコン酸等の有機酸が挙げられるが、酸度や水溶性の観点より硫酸やリン酸等の液体無機酸やクエン酸や酢酸等の高水溶性有機酸が好ましい。これらは単独であるいは２種以上を組み合わせて用いることができる。また、これらｐＨ調整剤は、そのまま本発明の第２の殺菌洗浄剤製造用組成物中に存在してよい。なお、上記した本発明の第１の殺菌洗浄剤製造用組成物にもこれらｐＨ調整剤を存在させることができる。

【0041】

本発明の第２の殺菌洗浄剤製造用組成物は、（Ａ）成分、（Ｂ）成分以外にも、前記したような界面活性剤、無機又は有機の塩類、キレート剤、香料、顔料、染料等を含有することができる。なお、上記した本発明の第１の殺菌洗浄剤製造用組成物にもこれら成分を存在させることができる。

【0042】

本発明の第２の殺菌洗浄剤製造用組成物はさまざまな形態をとることができるが、液状の場合、流動性の高いものが好ましく、水溶液の他、流動性のあるスラリー、ゲル、ペースト状等であってもよい。また、固体状の場合、粒状、粉状、顆粒状、ペレット状等の形状が挙げられる。

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【0043】
本発明の第２の殺菌洗浄剤製造用組成物は、配合成分のすべてをまとめて包装したものでもよいが、安定性の観点から、（Ａ）成分と（Ｂ）成分とを別々に包装した複数剤型のものが好ましい。例えば、（Ａ）成分を含む組成物の包装体（１）と、（Ｂ）成分を含む組成物の包装体（２）と、最終的にｐＨを１以上７未満とするためのｐＨ調整剤（クエン酸等の酸性ｐＨ調整剤）を含む組成物の包装体（３）とからなる三剤型の殺菌洗浄剤製造用組成物とすることができる。この場合、包装体（２）にアルカリ剤を配合しておき、包装体（１）と包装体（２）の混合物がｐＨ８～１２となるように調整することが好ましい。また、特に粉末の組成物の場合、（Ａ）成分と（Ｂ）成分が１つの包装体中に共存することも可能であり、例えば、（Ａ）成分と（Ｂ）成分とｐＨを８～１２に調整するためのアルカリ剤とを含む組成物の包装体（Ｉ）と、最終的にｐＨを１以上７未満とするためのｐＨ調整剤（クエン酸等の酸性ｐＨ調整剤）を含む組成物の包装体（II）とからなる二剤型の殺菌洗浄剤製造用組成物とすることができる。

【0044】
本発明の第２の殺菌洗浄剤製造用組成物は、使用時には、先の第一工程、第二工程によりｐＨを調整することで、有機過酸を含有する殺菌洗浄剤組成物である水溶液が調製される。当該水溶液中の有機過酸濃度は、１０～２０，０００ｐｐｍ（重量比、以下同様）、更に１０～１０，０００ｐｐｍであることが好ましい。また、当該水溶液中の過酸化水素含有量は０．５重量％以下、更に０．３重量％以下、特に０．２重量％以下であることが、殺菌効果の点で好ましい。これらの知見は、上記した本発明の第１の殺菌洗浄剤製造用組成物においても同様である。

【0045】
＜第３の殺菌洗浄剤製造用組成物＞
本発明の第３の殺菌洗浄剤製造用組成物は、上記本発明の（Ａ）成分と（Ｂ）成分とを配合して得られるものであり、第２の殺菌洗浄剤製造用組成物同様、（Ａ）成分と（Ｂ）成分由来の（Ｂ１）成分とのモル比が、（Ａ）／（Ｂ１）＝１／１０～２０／１であり、ｐＨを８～１２とした後、ｐＨを１以上７未満として調製された水溶液として用いられるものである。（Ａ）成分、（Ｂ）成分の具体的な化合物や、好ましい（Ａ）／（Ｂ１）のモル比も第２の殺菌洗浄剤製造用組成物と同様である。また、第３の殺菌洗浄剤製造用組成物にも、前記した界面活性剤、無機又は有機の塩類、キレート剤、香料、顔料、染料等を含有することができ、包装の態様も同様とすることができる。

【0046】
＜殺菌洗浄剤キット＞
本発明の硬質表面用殺菌洗浄剤組成物を得るための好適な殺菌洗浄剤キットは、本発明に係る殺菌洗浄剤製造用組成物と、該組成物によってもたらされる（Ａ）成分と（Ｂ１）成分の反応を開始させる反応開始剤〔以下、（Ｃ）成分という〕と、ｐＨ調整剤〔以下、（Ｄ）成分という〕とを含んで構成される。また、殺菌洗浄剤キットは、（Ａ）成分、（Ｂ）成分、（Ｃ）成分及び（Ｄ）成分を含んで構成されることもできる。

【0047】
本発明の硬質表面用殺菌洗浄剤組成物を得るための殺菌洗浄剤キットは、有機過酸製造時の簡便性を考慮して、配合成分の全てをまとめて包装した１剤型でもよいが、貯蔵時の安定性を考慮して、（Ａ）成分と（Ｂ）成分と（Ｃ）成分と（Ｄ）成分とを個別に包装した複数剤型であってもよい。好ましい殺菌洗浄剤キットの剤型としては、有機過酸製造時の簡便性と製造用組成物の貯蔵安定性との両観点を考慮して、（Ａ）～（Ｄ）成分のうち２成分以上を含む組成物を包装した包装体を含む２剤型、若しくは３剤型等の複数剤型である。

【0048】
（Ａ）成分と（Ｂ１）成分は、水中ではアルカリ条件（水温５～５０が好適）で反応して有機過酸を生成するため、（Ｃ）成分として、このようなｐＨを与える成分が使用できる。具体的には、アルカリ性のｐＨ調整剤として例示した水酸化ナトリウム、水酸化カリ

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ウム、水酸化カルシウム、水酸化バリウム等のアルカリ金属水酸化物又はアルカリ土類金属水酸化物、ケイ酸ナトリウム、ケイ酸カリウム等のケイ酸アルカリ金属塩、リン酸３ナトリウム等のアルカリ性を呈するリン酸アルカリ金属塩、炭酸ナトリウム、炭酸カリウム等の炭酸アルカリ金属塩が挙げられるが、アルカリ度や水溶性の観点より水酸化ナトリウムや水酸化カリウム等のアルカリ金属水酸化物、リン酸３ナトリウムやリン酸３カリウム等のリン酸アルカリ金属塩、炭酸ナトリウムや炭酸カリウム等の炭酸アルカリ金属塩が好ましい。

【0049】

一方、有機過酸を含有する殺菌洗浄剤は、酸性であることが殺菌効果の点で好ましいため、（Ｄ）成分は（Ｃ）成分によりアルカリ領域にあったｐＨを酸性領域にできる成分が使用される。具体的には、酸性のｐＨ調整剤として例示した塩酸、硫酸、リン酸等の無機酸、ギ酸、酢酸、クエン酸、コハク酸、グルコン酸等の有機酸が挙げられるが、酸度や水溶性の観点より硫酸やリン酸等の液体無機酸やクエン酸や酢酸等の高水溶性有機酸が好ましい。

【0050】

殺菌洗浄剤キットの具体的な剤型としては、

（Ｉ）（Ａ）成分と（Ｂ）成分とを含有する殺菌洗浄剤製造用組成物の包装体（Ｘ１）、（Ｃ）成分を含有する組成物の包装体（Ｘ２）、（Ｄ）成分を含有する組成物の包装体（Ｘ３）を含む３型以上の剤型

（II）（Ａ）成分を含有する組成物の包装体（Ｙ１）、（Ｂ）成分と（Ｃ）成分とを含有する組成物の包装体（Ｙ２）、（Ｄ）成分を含有する組成物の包装体（Ｘ３）を含む３型以上の剤型

（III）（Ａ）成分と（Ｂ）成分と（Ｃ）成分とを含有する組成物の包装体（Ｚ１）、（Ｄ）成分を含有する組成物の包装体（Ｚ２）を含む２剤型以上の剤型

が挙げられる。

【0051】

（Ｉ）の剤型では、殺菌洗浄剤製造用組成物の形態は、粉末状、固体状、液状等、限定されるものではないが、簡便性の観点から液状がより好ましい。液状の形態をとる場合、貯蔵中の（Ａ）成分と（Ｂ）成分の反応を抑制して安定性を維持するために、当該液状組成物中の水分含有量は１～２５重量％が好ましく、より好ましくは５～２０重量％であり、５～１５重量％が更により好ましい。また、必要に応じて、当該液状組成物にキレート剤、溶剤を添加することができる。ＦｅやＣｒ等の金属イオンの微量混入による触媒的分解を抑制するためにキレート剤は有用である。また、当該液状組成物の原液ｐＨ（２０℃）は、貯蔵安定性に関与するため、０．５～６が好ましく、より好ましくは１～５で、１～４が更により好ましい。前記の通り、ｐＨ調整剤としての作用とキレート剤としての作用を兼ね備えた成分を用いることが好ましく、具体的には、リン酸、重合リン酸、有機ホスホン酸、アミノカルボン酸、ヒドロキシカルボン酸、若しくはこれらの塩が好ましい。中でも、有機ホスホン酸若しくはその塩が好ましい。溶剤としては、多価アルコール溶剤が好ましく、プロピレングリコール等のグリコール溶剤が特に好ましい。

【0052】

また、（Ｉ）の剤型で殺菌洗浄剤製造用組成物が粉末、固形状の形態をとる場合は、（Ｂ）成分として過炭酸ナトリウムや過硼酸ナトリウム等を用いることが好ましい。同様に、（II）の剤型や（III）の剤型でも、貯蔵安定性の観点から、（Ｂ）成分を含む組成物は、（Ｂ）成分として過炭酸ナトリウムや過硼酸ナトリウム等を用いた粉末、固形状の形態が好適である。

【0053】

これら各剤型における（Ａ）～（Ｄ）成分の含有量は、前記した本発明の第１～第３の殺菌洗浄剤製造用組成物の用法に基づき、それぞれに適した範囲を選定することができる。また、（Ａ）～（Ｄ）成分以外の成分は、これら（Ａ）～（Ｄ）成分を含む何れかの包装体に配合しても、他の包装体に配合しても、何れでも良い。

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【0054】
上記の殺菌洗浄剤製造用組成物や殺菌洗浄剤キットは、（Ａ）多価アルコールと水酸基を有していても良い炭化水素基を有する有機酸とのエステルと（Ｂ１）過酸化水素とを、（Ａ）／（Ｂ１）＝１／１０～２０／１のモル比で、水中でｐＨ８～１２で反応させ、次いで当該反応系をｐＨ１以上７未満とする工程を有する、硬質表面用殺菌洗浄剤組成物の製造方法に適用できる。
【0055】
本発明の硬質表面用殺菌洗浄剤組成物は、自動スプレー装置、スプレーガンを用いる系でも好適である。また、増泡剤添加による泡洗浄殺菌も可能である。
【実施例】
【0056】
実施例１
以下において％は重量％を意味する。
【0057】
＜殺菌洗浄剤組成物（Ｉ）の調製＞
（Ａ）トリアセチン（コグニスジャパン社製、有効分１００％）５０ｇ、（Ｂ）過酸化水素（宇部ケミラ社製、有効分６０％）２５ｇをイオン交換水８５０ｇと混合し、この中に水酸化ナトリウム２７％、有機ホスホン酸（商品名：ディクエスト２０１０、ソルーシア社製、）１．３％を含有するアルカリ水溶液７５ｇを注ぎ５分間混合撹拌した。その後、直ちに硫酸３０％、リン酸６％からなる混合酸液を７５ｇ添加して、有機過酸を含有する殺菌洗浄剤組成物（Ｉ）を調製した。該組成物（Ｉ）のｐＨ（２５℃）は約２であり、過酸化水素含有量は約１５００ｐｐｍであった。
【0058】
＜殺菌洗浄剤組成物（II）の調製＞
（Ａ）Ｄ－グルコース－Ｏ－ペンタアセテート（試薬：東京化成社製、有効分１００％）５０ｇ、（Ｂ）過酸化水素（宇部ケミラ社製、有効分６０％）２５ｇをイオン交換水８５０ｇと混合し、この中に水酸化ナトリウム２７％、有機ホスホン酸（商品名：ディクエスト２０１０、ソルーシア社製、）１．３％を含有するアルカリ水溶液７５ｇを注ぎ５分間混合撹拌した。その後、直ちに硫酸３０％、リン酸６％からなる混合酸液を７５ｇ添加して、有機過酸を含有する殺菌洗浄剤組成物（II）を調製した。該組成物（II）のｐＨ（２５℃）は約２であり、過酸化水素含有量は約１５００ｐｐｍであった。
【0059】
＜有機過酸濃度の測定＞
１００ｍＬビーカーに調製した殺菌洗浄剤組成物（Ｉ）又は（II）を約１ｇ精秤し、イオン交換水約５０ｍＬと過酸化水素分解剤（商品名：アスクスーパーＧ、三菱ガス化学社製）約１ｍＬを注ぎよく撹拌して組成物中の過酸化水素のみを分解した。その後、２０％硫酸５ｍＬと１０％ヨウ化カリウム水溶液５ｍＬを注ぎ撹拌し、０．１ｍｏｌ／Ｌチオ流酸ナトリウム水溶液で滴定し、以下の式により有機過酸濃度（過酢酸濃度として）を求めた。

有機過酸（過酢酸）濃度（％）＝Ｔ×３８／Ｗ／１００

Ｔ：０．１ｍｏｌ／Ｌチオ硫酸ナトリウム水溶液の滴定所要量（ｍＬ）

Ｗ：殺菌洗浄剤組成物の採取量（ｇ）

【0060】
＜評価＞
上記殺菌洗浄剤組成物（Ｉ）、（II）及び表１、２に示す成分を用いて得た組成物を、表１、２の有機過酸濃度になるように水で希釈した試験水溶液を用いて、以下の方法で洗浄力及び殺菌力の評価試験を行った。結果を表１、２に示す。尚、殺菌洗浄剤組成物の比較対照品として、殺菌剤成分が無い場合や、代表的な酸素系殺菌剤である過酸化水素と塩素系殺菌剤である次亜塩素酸ナトリウムを用いた配合物を作製し、同様の評価試験を行った。

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【0061】
（１）洗浄力評価試験
洗浄力油汚れと蛋白質汚れのそれぞれのモデル汚れを作製後、ＪＩＳ Ｋ－３３６２９．２台所用合成洗剤の洗浄力評価方法に準じたリーナツ試験改良法でそれぞれの洗浄力を評価した。
【0062】
（１－１）油汚れ洗浄力評価
牛脂と大豆油を体積比１：１で混合した油脂２０ｇ、モノオレイン０．２５ｇ及びオイルレッド０．１ｇをクロロホルム６０ｍＬに溶かして油汚れ液を調製する。清浄なスライドガラスを６枚１組とし、１ｍｇまでそれぞれの質量を測定しておく。２５±１℃の油汚れ液中にスライドガラスを１枚ずつ約５５ｍｍのところまで約２秒間浸し、油汚れを付着させた後取り出す。スライドガラスの下部に付着した油汚れのたまりは清浄なガーゼ等の布や沪紙を用いて吸い取らせ、油汚れの付着を均一な状態にして、２５±１℃で風乾し質量を測定する。風乾放置時間１時間以上２時間以内にモデル汚れガラス片を試験に用いる。この際、モデル汚れガラス片の６枚あたりの油汚れ付着量は０．１４０±０．０１０ｇになるようにする。
【0063】
このモデル汚れガラス片６組を、２５±２℃で５分間、リーナツ改良洗浄機を用いて洗浄し、イオン交換水で２５±２℃３０秒間すすぐ。すすぎが終了したガラス片は、一昼夜風乾させる。洗浄力の評価は、モデル汚れガラス片の洗浄前後の重量より算出する。即ち、洗浄前と洗浄後の重量差を求め、次式により洗浄率（％）を算出する。
洗浄率（％）＝〔（洗浄前重量－洗浄後重量）／汚垢付着量〕×１００
６枚のガラス片についてそれぞれの洗浄率を求め、最大値と最小値を除いた４枚の洗浄率の平均値をその組成物の洗浄率とした。
【0064】
（１－２）蛋白質汚れ洗浄力評価
脱脂粉乳２０ｇを６０℃のイオン交換水で希釈溶解し、合計１００ｇとし、蛋白質汚れ液とする。２５ア１℃の蛋白質汚れ液に清浄なスライドガラスを１枚ずつ約５５ｍｍのところまで約２秒間浸し、蛋白質汚れを付着させた後取り出す。スライドガラスの下部に付着した蛋白質汚れのたまりは清浄なガーゼ等の布や沪紙を用いて吸い取らせ、蛋白質汚れの付着を均一な状態にして、２５ア１℃で風乾する。これをもう一度繰り返し、片面の汚れを完全に除去後、風乾し１１０℃で１時間変性を行い、試験片とする。この試験片を１２時間以上２４時間以内に試験に用いる。試験片を、２５ア２℃で５分間、リーナツ改良洗浄機を用いて洗浄し、イオン交換水で２５ア２℃３０秒間すすぐ。すすぎ後、７０℃で３０分乾燥し、エリスロシン１重量%溶液で着色後、着色面積（S_1）を写真判定により測定し、初期（洗浄前）の蛋白質汚れ付着面積（S_0）から洗浄率（％）を次式により算出する。
洗浄率（％）＝〔（S_0－S_1）／S_0〕×１００
６枚のガラス片についてそれぞれの洗浄率を求め、最大値と最小値を除いた４枚の洗浄率の平均値をその組成物の洗浄率とした。
【0065】
（１－３）泡による油汚れ洗浄力評価
牛脂と大豆油を体積比１：１で混合した油脂２０ｇ、モノオレイン０．２５ｇ及びオイルレッド０．１ｇをクロロホルム６０ｍＬに溶かして油汚れ液を調製する。清浄なスライドガラス（７６ｍｍ×２６ｍｍ×１ｍｍ）を６枚１組とし、１ｍｇまでそれぞれの質量を測定しておく。２５±１℃の油汚れ液中にスライドガラスを１枚ずつ約５５ｍｍのところまで約２秒間浸し、油汚れを付着させた後取り出す。スライドガラスの下部に付着した油汚れのたまりは清浄なガーゼ等の布や沪紙を用いて吸い取らせ、油汚れの付着を均一な状態にして、２５±１℃で風乾し質量を測定する。風乾放置時間１時間以上２時間以内にモデル汚れガラス片を試験に用いる。この際、モデル汚れガラス片の６枚あたりの油汚れ付

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着量は０．１４０ア０．０１０ｇになるようにする。

【0066】

３００ｍＬビーカーに、試験水溶液３００ｍＬ（２５℃）を入れ、先端にエアーストーンを取り付けたシリコンホースを試験水溶液中に沈め、エアーポンプで空気を送り（流量１．５リットル／分）、泡を発生させる。あふれた泡に、モデル汚れガラス片を１枚ずつ５分間接触させ、イオン交換水で２５ア２℃３０秒間すすぐ。すすぎが終了したガラス片は、一昼夜風乾させる。洗浄力の評価は、モデル汚れガラス片の洗浄前後の重量より算出する。即ち、洗浄前と洗浄後の重量差を求め、次式により洗浄率（％）を算出する。

洗浄率（％）＝〔（洗浄前重量－洗浄後重量）／汚垢付着量〕×１００

６枚のガラス片についてそれぞれの洗浄率を求め、最大値と最小値を除いた４枚の洗浄率の平均値をその組成物の洗浄率とした。

【0067】

（２）殺菌力評価試験

芽胞形成菌である枯草菌（Bacillus subtilis ATCC6633）をＳＣＤ寒天培地（日本製薬（株）製）に３０℃で約１週間前培養した後、寒天培地上に形成されたコロニーをかきとり、１mLの滅菌水に懸濁し、検鏡して細菌芽胞（以下芽胞という）の形成を確認した。６５℃、３０分間の熱処理後、２回遠心洗浄を行った後、適量の滅菌水で約10^8cell／mLの菌濃度に調整した。この芽胞菌液１．０mLを、上記（１）洗浄力評価試験と同様に調製して１枚のモデル汚れガラス片に均一に接種した後、風乾し殺菌試験用ガラス片を得た。

【0068】

殺菌試験用ガラス片を、上記（１）洗浄力評価試験の（１－３）項と同様に発生させた試験水溶液の泡に５分間接触させ、すぐに滅菌水ですすいだ。ガラス片表面が乾燥する前に、ガラス片の所定面積（２０ｍｍ×２０ｍｍ）を滅菌綿棒で拭き取り、この綿棒を１mLの滅菌水（３．３％チオ硫酸ナトリウム加）に浸漬し付着物を懸濁した。その懸濁液の１００μＬを後培養用ＳＣＤ培地（日本製薬（株）製）２．０mLの入った滅菌済み試験管へ接種した。これを３５℃で４８時間培養し、菌の発育を肉眼で観察し、菌の育成がない場合を「○」、ある場合を「×」とした。

【0069】

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【表1】

		本発明品							
		1	2	3	4	5	6	7	8
試験水溶液	殺菌剤組成物(I)	2000ppm				1000ppm	1000ppm	1500ppm	3000ppm
	殺菌剤組成物(II)		1500ppm	1500ppm	1000ppm				
	過酸化水素								
	次亜塩素酸ナトリウム								
	ポリオキシエチレンラウリル硫酸ナトリウム(1)	500ppm		1000ppm			500ppm		
	ラウリルジメチルアミンオキサイド(2)				200ppm				
	塩化ベンザルコニウム(3)					100ppm			
	アルキルポリグリコシド(4)		1000ppm		500ppm	1000ppm	300ppm		
	ポリオキシエチレンラウリルエーテル(5)							1000ppm	
評価	(1-1)油汚れ洗浄率(%)	59	62	60	56	63	61	58	41
	(1-2)蛋白汚れ洗浄率(%)	60	60	59	58	61	60	59	40
	(1-3)油汚れ洗浄率(%)	56	58	58	57	58	57	58	41
	殺菌力	○	○	○	○	○	○	○	○

【0070】

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【表2】

		比較品							
		1	2	3	4	5	6	7	8
試験水溶液	殺菌剤組成物(I)								
	殺菌剤組成物(II)								
	過酸化水素					1.0%	1.0%		
	次亜塩素酸ナトリウム							400ppm	200ppm
	ﾎﾟﾘｵｷｼｴﾁﾚﾝﾗｳﾘﾙ硫酸ﾅﾄﾘｳﾑ(1)	500ppm		1000ppm			500ppm		
	ﾗｳﾘﾙｼﾞﾒﾁﾙｱﾐﾝｵｷｻｲﾄﾞ(2)				200ppm				200ppm
	塩化ﾍﾞﾝｻﾞﾙｺﾆｳﾑ(3)					100ppm			
	ｱﾙｷﾙﾎﾟﾘｸﾞﾘｺｼﾄﾞ(4)		1000ppm		500ppm	1000ppm	300ppm		500ppm
	ﾎﾟﾘｵｷｼｴﾁﾚﾝﾗｳﾘﾙｴｰﾃﾙ(5)							1000pm	
評価	(1-1)油汚れ洗浄率(%)	56	58	55	54	64	60	59	44
	(1-2)蛋白汚れ洗浄率(%)	56	51	50	55	60	60	64	53
	(1-3)油汚れ洗浄率(%)	51	55	57	52	58	52	57	45
	殺菌力	×	×	×	×	×	×	×	×

【0071】

表中の過酸化水素の濃度は過酸化水素有効分濃度を、また次亜塩素酸ナトリウム濃度は有効塩素濃度を示す。また、界面活性剤は以下のものである。

（１）：エマール２０Ｃ〔花王（株）製、有効分２５％〕を用いて有効分濃度が表１の数値となるようにした。

（２）：アンヒトール２０Ｎ〔花王（株）製、有効分３５％〕を用いて有効分濃度が表１

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の数値となるようにした。
（３）：サニゾールＣ〔花王（株）製、有効分５０％〕を用いて有効分濃度が表１の数値となるようにした。
（４）：マイドール１２〔花王（株）製、有効分４０％〕を用いて有効分濃度が表１の数値となるようにした。
（５）：エマルゲン１０６〔花王（株）製、有効分１００％〕を用いて有効分濃度が表１の数値となるようにした。

【手続補正書】
【提出日】平成17年8月4日(2005.8.4)
【手続補正1】
【補正対象書類名】明細書
【補正対象項目名】００６４
【補正方法】変更
【補正の内容】
【0064】
（１－２）蛋白質汚れ洗浄力評価
脱脂粉乳２０ｇを６０℃のイオン交換水で希釈溶解し、合計１００ｇとし、蛋白質汚れ液とする。２５±1℃の蛋白質汚れ液に清浄なスライドガラスを１枚ずつ約５５ｍｍのところまで約２秒間浸し、蛋白質汚れを付着させた後取り出す。スライドガラスの下部に付着した蛋白質汚れのたまりは清浄なガーゼ等の布や沪紙を用いて吸い取らせ、蛋白質汚れの付着を均一な状態にして、２５±１℃で風乾する。これをもう一度繰り返し、片面の汚れを完全に除去後、風乾し１１０℃で１時間変性を行い、試験片とする。この試験片を１２時間以上２４時間以内に試験に用いる。試験片を、２５±2℃で５分間、リーナツ改良洗浄機を用いて洗浄し、イオン交換水で２５±2℃３０秒間すすぐ。すすぎ後、７０℃で３０分乾燥し、エリスロシン１重量%溶液で着色後、着色面積（S_1）を写真判定により測定し、初期（洗浄前）の蛋白質汚れ付着面積（S_0）から洗浄率（％）を次式により算出する。

洗浄率（％）＝〔（S_0－S_1）／S_0〕×１００

６枚のガラス片についてそれぞれの洗浄率を求め、最大値と最小値を除いた４枚の洗浄率の平均値をその組成物の洗浄率とした。

【手続補正2】
【補正対象書類名】明細書
【補正対象項目名】００６５
【補正方法】変更
【補正の内容】
【0065】
（１－３）泡による油汚れ洗浄力評価
牛脂と大豆油を体積比１：１で混合した油脂２０ｇ、モノオレイン０．２５ｇ及びオイルレッド０．１ｇをクロロホルム６０ｍＬに溶かして油汚れ液を調製する。清浄なスライドガラス（７６ｍｍ×２６ｍｍ×１ｍｍ）を６枚１組とし、１ｍｇまでそれぞれの質量を測定しておく。２５±１℃の油汚れ液中にスライドガラスを１枚ずつ約５５ｍｍのところまで約２秒間浸し、油汚れを付着させた後取り出す。スライドガラスの下部に付着した油汚れのたまりは清浄なガーゼ等の布や沪紙を用いて吸い取らせ、油汚れの付着を均一な状態にして、２５±１℃で風乾し質量を測定する。風乾放置時間１時間以上２時間以内にモデル汚れガラス片を試験に用いる。この際、モデル汚れガラス片の６枚あたりの油汚れ付着量は０．１４０±０．０１０ｇになるようにする。

【手続補正3】
【補正対象書類名】明細書
【補正対象項目名】００６６
【補正方法】変更

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【補正の内容】
【0066】
３００ｍＬビーカーに、試験水溶液３００ｍＬ（２５℃）を入れ、先端にエアーストーンを取り付けたシリコンホースを試験水溶液中に沈め、エアーポンプで空気を送り（流量１．５リットル／分）、泡を発生させる。あふれた泡に、モデル汚れガラス片を１枚ずつ５分間接触させ、イオン交換水で２５±２℃３０秒間すすぐ。すすぎが終了したガラス片は、一昼夜風乾させる。洗浄力の評価は、モデル汚れガラス片の洗浄前後の重量より算出する。即ち、洗浄前と洗浄後の重量差を求め、次式により洗浄率（％）を算出する。

洗浄率（％）＝〔（洗浄前重量－洗浄後重量）／汚垢付着量〕×１００

６枚のガラス片についてそれぞれの洗浄率を求め、最大値と最小値を除いた４枚の洗浄率の平均値をその組成物の洗浄率とした。

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