

DESCRIPTION

TITLE OF THE INVENTION: DETERGENT COMPOSITION, CLEANING SHEET FOR HARD SURFACES AND CLEANING METHOD FOR HARD SURFACES

TECHNICAL FIELD

[0001] The present invention relates to a detergent composition, a cleaning sheet for hard surfaces and a cleaning method for hard surface.

BACKGROUND ART

[0002] In the equipment surrounding our living environment, there are various hard surfaces made of tile, plastic, metal and other materials, and these hard surfaces are exposed to the environment with various dirt in the life scene. Among them, hard surfaces used in a toilet, a bathroom and a kitchen are also contacted daily by people, so it is easy to remain and accumulate a large amount of dirt, which is difficult to be cleaned and removed.

[0003] In Patent Document 1, a wet towel specially used for kitchen cleaning and disinfection is disclosed, and it is obtained by evenly infiltrating the liquid with cleaning and disinfection function on spunlaced non-woven fabric, and the liquid with cleaning and disinfection function is described to contain an sodium α -alkenyl sulfonate, a fatty alcohol polyoxyethylene ether sodium sulfate, a C12 fatty alcohol polyoxyethylene (9) ether, a disodium ethylenediamine tetraacetate, a citric acid, a sodium citrate, a 1,2-propylene glycol and the like, and it is excellent in detergency against stubborn denatured grease stains.

PRIOR ART REFERENCES

PATENT DOCUMENTS

Patent Document 1: CN103340584

SUMMARY OF THE INVENTION

[0004] The present invention provides, for example, a detergent composition suitable

for hard surface cleaning, which has high detergency against grease stains and has less white residue after cleaning.

[0005] The present inventor has found that: by using the combination of a specific polyoxyethylene glycerol fatty acid ester, a specific surfactant and a specific acid and/or a salt as cleaning effective components in the detergent composition, the hydrophobicity of the detergent composition may be improved, and when in use, the cleaning effective components in the detergent composition are easily adsorbed to the grease stains and improve the detergency against the grease stains, and a small amount of cleaning active components or cleaning auxiliary components may be used to achieve high detergency, and meanwhile, the white residue as a wipe trace after cleaning and wiping the hard surface with the detergent composition may be significantly reduced.

[0006] In addition, in the present specification, “white residue” refers to the white substance remaining on the hard surface after the detergent composition is applied to the hard surface for cleaning, especially the hard surface is wiped, and the volatiles such as water and ethanol and the like on hard surfaces volatilize.

[0007] The present invention relates to a detergent composition, which contains following components (A)~(D),

(A): a polyoxyethylene glycerol fatty acid ester, which has an oxyethylene group having an average added mole number of 10 moles or less, and has a linear or branched saturated or unsaturated fatty acyl group having 12 or less carbon atoms;

(B): water;

(C): a surfactant which has an alkyl group or an alkenyl group having 8 to 18 carbon atoms other than the component (A); and

(D): one or more components selected from a component (D1) and a component (D2):

(D1): an organic acid or its salt,

(D2): an inorganic salt,

in the detergent composition, a content of the component (A) is 0.35% by mass or

more and 5% by mass or less, and when a content of the component (D1) is calculated as acid, and a content of the component (D2) is calculated as salt, a content of the component (D) is 0.005% by mass or more and 0.4% by mass or less, and as a total content of the component (A) and the component (C), (A)+(C) is 10% by mass or less.

[0008] In addition, the present invention relates to a cleaning sheet for hard surfaces, which contains the detergent composition of the present invention.

[0009] Further, the present invention relates to a cleaning method for hard surface, which includes applying the detergent composition of the present invention to hard surfaces for cleaning.

[0010] According to the present invention, the detergent composition of the present invention has high detergency against grease stains and has the effect of less white residue after cleaning hard surfaces. The detergent composition of the present invention is suitable for various hard surfaces.

[0011] In addition, in the present specification, “white residue” refers to the white substance remaining on the hard surface after the detergent composition is applied to the hard surface for cleaning, especially the hard surface is wiped, and the volatiles such as water and ethanol and the like on hard surfaces volatilize.

EMBODIMENTS FOR CARRYING OUT THE INVENTION

[0012] [Detergent Composition]

The detergent composition of the present invention contains a component (A), a component (B), a component (C) and a component (D).

[0013] <Component (A)>

The component (A) of the present invention is a polyoxyethylene glycerol fatty acid ester, wherein the polyoxyethylene glycerol fatty acid ester has an oxyethylene group having an average added mole number of 10 moles or less, and has a linear or branched saturated or unsaturated fatty acyl groups having 12 or less carbon atoms. The component (A) is a cleaning effective component.

[0014] The component (A) may contain 1 or more and 3 or less fatty acyl groups. As a source of a fatty acid ester of the component (A), the fatty acid has carbon atoms of preferably 8 or more and 12 or less, more preferably 8 or more and 10 or less, from the viewpoint of improving detergency. As specific examples of the fatty acid, one or more fatty acids selected from various octanoic acids (for example, also including a 2-ethylhexanoic acid), various nonanoic acids, various decanoic acids, various undecanoic acids and various dodecanoic acids may be exemplified.

[0015] In the present invention, the so-called "various" means various isomers including ortho, secondary, tertiary and hetero. For example, "various octanoic acids" includes not only linear n-octanoic acids, but also fatty acids of various isomers having 8 carbon atoms.

[0016] From the viewpoint of improving detergency, average added mole number of an oxyethylene group is preferably more than 0, more preferably 4 or more, further preferably 6 or more, and from the viewpoint of stability, it is preferably 9 or less, more preferably 8 or less.

[0017] As preferred specific examples of the component (A), it may be exemplified: a polyoxyethylene glycerol (an octanoic acid/ a decanoic acid) ester (average added mole number of the oxyethylene group is 6 moles), and a polyoxyethylene glycerol laurate (average added mole number of the oxyethylene group is 8 moles).

[0018] In the detergent composition of the present invention, the component (A) may be used by selecting one of the above polyoxyethylene glycerol fatty acid esters or two or more in combination. In the detergent composition of the present invention, from the viewpoint of improving detergency, a content of the component (A) is 0.35% by mass or more, preferably 0.4% by mass or more, more preferably 0.5% by mass or more, further preferably 0.7% by mass or more, further preferably 0.8% by mass or more, much further preferably 1% by mass or more, and is 5% by mass or less, preferably 2.6% by mass or less, more preferably 1.3% by mass or less, further preferably 1.1% by mass or less. Moreover, from the viewpoint of reducing white residue, the content of the component (A) is 5% by

mass or less, preferably 2.6% by mass or less, more preferably 1.6% by mass or less.

[0019] <Component (B)>

The component (B) of the detergent composition of the present invention is water. That is, the remaining part other than the above component (A), the following component (C) and the component (D) and other components is the component (B) water.

[0020] In the detergent composition of the present invention, a content of the component (B) is 85% by mass or more, more preferably 90% by mass or more, further preferably 95% by mass or more, much further preferably 96% by mass or more, and 99% by mass or less, preferably 98% by mass or less.

[0021] As the water, ion-exchanged water, sterilized ion-exchanged water or the like is preferably used.

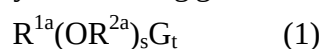
[0022] <Component (C)>

The component (C) of the present invention is a surfactant which has an alkyl group or an alkenyl group having 8 to 18 carbon atoms other than the component (A). The combination of the component (C) and the component (A) may improve the solubility of the component (A) in the composition and prevent its precipitation, which is conducive to the cleaning performance of the component (A). As the surfactant of the component (C), there is no particular limit, and surfactants widely used in the field of cleaning compositions may be used. Specifically, one or more surfactants selected from (C1) a non-ionic surfactant, (C2) an amphoteric surfactant, and (C3) a cationic surfactant may be exemplified.

[0023] <(C1) Non-ionic Surfactant >

As (C1) a non-ionic surfactant, one or more non-ionic surfactants selected from an alkyl glycoside, a polyoxyethylene alkyl ether or a polyoxyethylene alkenyl ether may be exemplified, and among them, the alkyl glycoside is preferred.

[0024] As preferred specific examples of the alkyl glycoside, the non-ionic surfactant represented by the following general formula (1) may be exemplified.



[In the formula, R^{1a} represents a linear or branched alkyl group or alkenyl

group having 8 or more and 18 or less carbon atoms, preferably 12 or more and 14 or less carbon atoms, and R^{2a} represents an alkylene group having 2 or more and 4 or less carbon atoms, G represents a residue group from reducing sugar having 5 or 6 carbon atoms, and s represents an average added mole number of 0 or more and 5 or less, and t represents an average number of 1 or more and 5 or less.]

[0025] In the general formula (1), in terms of their easy availability and cost, for G, one or more residues of monosaccharides selected from a glucose and a fructose may be exemplified. Additionally, for G, one or more residues of polysaccharides selected from a maltose and a sucrose may be exemplified. G is preferably a residue of monosaccharides from a glucose.

[0026] As a polyoxyethylene alkyl ether or a polyoxyethylene alkenyl ether, from the viewpoint of detergency against grease stains, its carbon atoms of an alkyl group or an alkenyl group is preferably 8~18, and its added mole number of an ethylene oxide is preferably 1~30 moles, and as its preferred specific example, a polyoxyethylene hexyl decyl ether, a polyoxyethylene lauryl ether, a polyoxyethylene cetyl ether, a polyoxyethylene stearyl ether and the like may be exemplified.

[0027] <(C2) Amphoteric Surfactant >

As (C2) an amphoteric surfactant, one or more amphoteric surfactants selected from an amine oxide and a betaine may be exemplified, and among them, the amine oxide is preferred.

[0028] As preferred specific examples of the amine oxide, it may be exemplified:

(1) An alkyl (8 or more and 18 or less carbon atoms) dialkyl (1 or more and 3 or less carbon atoms) amine oxide such as an octyl dimethylamine oxide, a decyl dimethylamine oxide, a lauryl dimethylamine oxide, a myristyl dimethylamine oxide, a palmityl dimethylamine oxide, a stearyl dimethylamine oxide, and the like.

(2) A fatty acid (8 or more and 18 or less carbon atoms) amidopropyl dialkyl (1 or more and 3 or less carbon atoms) amine oxide such as a lauramidopropyl dimethylamine oxide, a myristate amidopropyl dimethylamine oxide, a palm oil-derived fatty

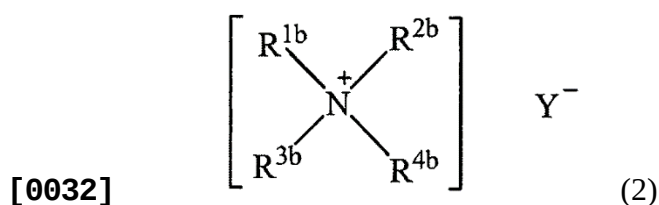
acid amidopropyl dimethylamine oxide, a stearamidopropyl dimethylamine oxide, and the like .

[0029] Wherein, in terms of coordination stability, it is more preferably the alkyl (8 or more and 18 or less carbon atoms) dialkyl (1 or more and 3 or less carbon atoms) amine oxide.

[0030] As the betaine, it may be exemplified: a carbonyl betaine, an amidobetaine, a sulfobetaine, an amidosulfobetaine, an imidazoline betaine or a phosphate betaine of an alkyl group or an alkenyl group having 8 or more and 18 or less carbon atoms.

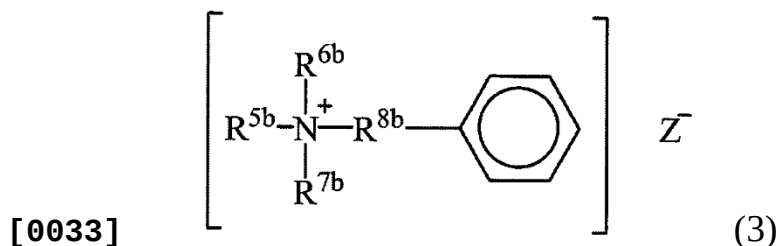
[0031] <(C3) Cationic Surfactant >

As (C3) a cationic surfactant, it is preferably a mono-long chain or di-long chain alkyl quaternary ammonium salt. As a component (C3), it is preferably the cationic surfactant selected from a compound represents by the following general formula (2) and a compound represents by the following general formula (3).



[In the general formula (2), at least one selected from R^{1b} and R^{2b} represents an alkyl group having 8 or more and 18 or less carbon atoms, an alkenyl group having 8 or more and 18 or less carbon atoms or a hydroxyalkyl group having 8 or more and 18 or less carbon atoms, the remaining groups represent the alkyl group having 1 or more and 3 or less carbon atoms, the hydroxyalkyl group having 1 or more and 3 or less carbon atoms or a polyoxyethylene group having an average added mole number of 10 moles or less; R^{3b} and R^{4b} are the same or different, and they represent the alkyl group having 1 or more and 3 or less carbon atoms, the hydroxyalkyl group having 1 or more and 3 or less carbon atoms or the polyoxyethylene group having an average added mole number of 10 moles or less respectively; Y^- represents an anion residue such as a halogen ion, a sulfonic acid ion having 1 or more and 5 or less carbon atoms or a sulfuric acid ion having 1 or more and 5 or less

carbon atoms.]



[0034] [In the general formula (3), R^{5b} represents an alkyl group having 8 or more and 18 or less carbon atoms, an alkenyl group having 8 or more and 18 or less carbon atoms or a hydroxyalkyl group having 8 or more and 18 or less carbon atoms; R^{6b} and R^{7b} are the same or different, and they represent the alkyl group having 1 or more and 3 or less carbon atoms, the hydroxyalkyl group having 1 or more and 3 or less carbon atoms or the polyoxyethylene group having an average added mole number of 10 moles or less respectively; R^{8b} represents an alkylene group having 1 or more and 3 or less carbon atoms; Z^- represents an anion residue such as a halogen ion, a sulfonic acid ion having 1 or more and 5 or less carbon atoms or a sulfuric acid ion with 1 or more and 5 or less carbon atoms.]

[0035] In the case of a mono-long chain alkyl quaternary ammonium salt, in the formula (2), preferably, R^{1b} is an alkyl group, an alkenyl group or a hydroxyalkyl group having 8 or more and 16 or less carbon atoms, and R^{2b} , R^{3b} and R^{4b} are the same or different, they are the alkyl group or the hydroxyalkyl group having 1 or more and 3 or less carbon atoms or a polyoxyethylene group having an average added mole number of 10 moles or less respectively.

[0036] In the case of a di-long chain alkyl quaternary ammonium salt, in the formula (2), preferably, R^{1b} and R^{2b} are the same or different, and they are an alkyl group, an alkenyl group or a hydroxyalkyl group having 8 or more and 16 or less carbon atoms respectively, and R^{3b} and R^{4b} are the same or different, and they are the alkyl group or the hydroxyalkyl group having 1 or more and 3 or less carbon atoms or a polyoxyethylene group having the average added mole number of 10 moles or less respectively.

[0037] In the formula (3), R^{5b} is preferably a linear alkyl group having 12 or more and

16 or less carbon atoms, and R^{6b} and R^{7b} are preferably a methyl group, and R^{8b} is preferably a methylene group, and Z^- is a halide ion, and further preferably a chloride ion (Cl^-).

[0038] As a cationic surfactant, it is preferably the cationic surfactant selected from the compound represented by the above general formula (3).

[0039] In the detergent composition of the present invention, as the component (C), one component or a combination of two or more components selected from the above (C1) a non-ionic surfactant, (C2) an amphoteric surfactant, and (C3) a cationic surfactant may be used. In the detergent composition of the present invention, from the viewpoint of improving detergency, the content of the component (C) is 0.02% by mass or more, preferably 0.03% by mass or more, and from the viewpoint of reducing white residue, it is 5% by mass or less, preferably 3% by mass or less, more preferably 1% by mass or less, further preferably 0.2% by mass or less, much further preferably 0.1% by mass or less.

[0040] Further, from the viewpoint of improving detergency and reducing white residue, the total content of the component (A) and the component (C) ((A)+(C)) is 10% by mass or less, preferably 3% by mass or less, preferably 2% by mass or less, more preferably 1.8% by mass or less, and further preferably 1.5% by mass or less, and is preferably 0.5% by mass or more, more preferably 0.8% by mass or more, further preferably 1% by mass or more.

[0041] In addition, in order to obtain sufficient detergency, the mass ratio of the polyoxyethylene glycerol fatty acid ester of the component (A) to the surfactant of the component (C) which has an alkyl group or an alkenyl group having 8 to 18 carbon atoms other than the component (A), which is calculated as (A)/(C) is 70 or less, preferably 60 or less, more preferably 20 or less, more preferably 10 or less, further preferably 8 or less, much further preferably 7 or less, and is 2 or more, preferably 3 or more, more preferably 4 or more, further preferably 5 or more.

[0042] <Component (D)>

The component (D) of the present invention is one or more components selected from the following component (D1) and component (D2), wherein the component (D1) is an

organic acid or its salt, and the component (D2) is an inorganic salt.

[0043] As an organic acid of the component (D1), specifically, an acetic acid, a lactic acid, a malic acid, a citric acid, a succinic acid, an adipic acid, an ethylenediamine tetraacetic acid, an ethylene glycol bis (a 2-aminoethyl ether) tetraacetic acid, a benzoic acid, and the like may be exemplified.

[0044] As an organic salt of the component (D1), a salt formed by the above organic acid and a metal such as an alkali metal, an alkaline earth metal or an aluminum may be exemplified. Specifically, a sodium acetate, a potassium acetate, a sodium lactate, a potassium lactate, an aluminum lactate, a sodium malate, a potassium malate, a sodium citrate, a potassium citrate, a sodium succinate, a potassium succinate, a sodium ethylenediamine tetraacetate, a potassium ethylenediamine tetraacetate, a sodium ethylene glycol bis(2-aminoethyl ether) tetraacetate, a potassium ethylene glycol bis(2-aminoethyl ether) tetraacetate, a sodium benzoate, a potassium benzoate, and the like may be exemplified.

[0045] An organic acid and its salt may be used alone or two or more in combination. From the viewpoint of improving stability and detergency, it is preferably a citric acid, a monosodium citrate, a disodium citrate, a trisodium citrate, a monopotassium citrate, a dipotassium citrate, a tripotassium citrate, an ethylenediamine tetraacetic acid, a disodium ethylenediamine tetraacetate, a trisodium ethylenediamine tetraacetate, a dipotassium ethylenediamine tetraacetate, a tripotassium ethylenediamine tetraacetate, an ethylene glycol bis (2-aminoethyl ether) tetraacetic acid, a disodium ethylene glycol bis (2-aminoethyl ether) tetraacetate, a trisodium ethylene glycol bis (2-aminoethyl ether) tetraacetate, a dipotassium ethylene glycol bis (2-aminoethyl ether) tetraacetate, a tripotassium ethylene glycol bis (2-aminoethyl ether) tetraacetate, a sodium benzoate, a potassium benzoate, and the like. Among these, it is more preferably the citric acid, the monosodium citrate, the disodium citrate, the trisodium citrate, the disodium ethylenediamine tetraacetate and the trisodium ethylenediamine tetraacetate. It is further preferably the citric acid, the disodium citrate and the disodium ethylenediamine tetraacetate.

[0046] As an inorganic salt of the component (D2), a salt formed by an inorganic acid

selected from a hydrochloric acid, a sulfuric acid, a silicic acid, a carbonic acid and a metal such as an alkali metal, an alkaline earth metal, an aluminum, and the like may be exemplified. Specifically, a sodium chloride, a potassium chloride, a magnesium chloride, a calcium chloride, an aluminum chloride, a sodium sulfate, a potassium sulfate, a magnesium sulfate, an aluminum sulfate, a sodium silicate, a sodium carbonate, a potassium carbonate, a sodium bicarbonate, a potassium bicarbonate, and the like may be exemplified. These inorganic acids and their salts may be used alone or two or more in combination. From the viewpoint of improving stability and detergency, it is preferably a calcium chloride, a magnesium sulfate or an aluminum chloride.

[0047] In the detergent composition of the present invention, the component (D) may be used alone or two or more in combination selected from the above component (D1) an organic acid or its salt and the above component (D2) an inorganic salt. Among them, it is preferably one or more components selected from the component (D1) an organic acid or its salt.

[0048] In the detergent composition of the present invention, when the component (D) is the component (D1), from the viewpoint of improving detergency of the composition, the content of the component (D1), which is calculated as acid, is 0.005% by mass or more, preferably 0.007% by mass or more, more preferably 0.01% by mass or more, further preferably 0.03% by mass or more, and from the viewpoint of improving detergency of the composition and reducing white residue, it is 0.4% by mass or less, more preferably 0.3% by mass or less, further preferably 0.2% by mass or less.

[0049] In the detergent composition of the present invention, when the component (D) is the component (D2), from the viewpoint of improving detergency of the composition, the content of the component (D2), which is calculated as salt, is 0.005% by mass or more, and from the viewpoint of reducing white residue, it is 0.4% by mass or less, more preferably 0.3% by mass or less, further preferably 0.2% by mass or less.

[0050] In the detergent composition of the present invention, when the component (D) is the combination of the component (D1) and the component (D2), the content of the

component (D1) is calculated as acid, and the content of the component (D2) is calculated as salt, from the viewpoint of improving detergency of the composition, the content of the component (D) is 0.005% by mass or more, preferably 0.007% by mass or more, more preferably 0.01% by mass or more, further preferably 0.03% by mass or more, and from the viewpoint of improving detergency of the composition and reducing white residue, it is 0.4% by mass or less, more preferably 0.3% by mass or less, further preferably 0.2% by mass or less.

[0051] <Other Components>

In the detergent composition of the present invention, other than the above components, other components may also be combined within the scope of not damaging the object or effect of the present invention, for example, a lower alcohol such as an isopropanol, and the like and a dissolvent such as a diethylene glycol monobutyl ether, and the like; a viscosity regulator such as a clay mineral, a water-soluble polymer compound, and the like; a humectant such as glycerin and sorbitol, and the like; a tactile enhancer such as a cationic cellulose, and the like; an enzyme, a pigment, a fragrance, an antiseptic and antifungal agents, and the like.

[0052] The detergent composition of the present invention may be manufactured by appropriately mixing the above combining components.

[0053] [Cleaning Sheet for Hard Surfaces]

The present invention provides a cleaning sheet for hard surfaces, and it contains a detergent composition of the present invention. The cleaning sheet for hard surfaces of the present invention consists of the detergent composition and a substrate.

[0054] As a substrate used in the present invention, it has flexibility, and it may contain an impregnated detergent composition, have sufficient strength and not produce slag.

[0055] As this kind of substrate, a fibrous structure composed of fibrous materials may be exemplified, for example, various paper towels, non-woven fabrics, weaving cloths or woven fabrics. As the fibrous materials that make up the fibrous structures, for example, cellulose-based fibers, modified cellulose-based fibers, synthetic fibers and the combination of two or more of these, and the like may be exemplified. In addition, a porous structure

(such as a sponge) obtained by dispersing bubbles in a resin may also be used as the above substrate.

[0056] Moreover, from the viewpoint of the retention of the detergent composition, the basis weight of the above substrate is preferably 30 g/m² or more, more preferably 40 g/m² or more, further preferably 50 g/m² or more, and is preferably 200 g/m² or less, more preferably 150 g/m² or less.

[0057] As a cleaning sheet for hard surfaces of the present invention, it may be manufactured by making a substrate be impregnated with the detergent composition of the present invention in advance, or by making the dry substrate be impregnated with the detergent composition of the present invention just before use. Impregnating may be achieved by methods such as spraying, extruding and dripping the detergent composition of the present invention onto the substrate or impregnating the substrate in the detergent composition of the present invention.

[0058] When a cleaning sheet for hard surfaces is manufactured by making a substrate be impregnated with the detergent composition of the present invention in advance, from the viewpoint of reducing white residue and improving detergency, in the cleaning sheet, the ratio of the mass of the detergent composition to the mass of the substrate [that is, (the mass of the detergent composition/the mass of the substrate in the non-impregnated state (the dry state)) ×100], that is, the impregnation ratio is preferably 100% by mass or more, more preferably 150% by mass or more, and preferably 900% by mass or less, more preferably 400% by mass or less, further preferably 350% by mass or less. If the impregnation ratio is 100% by mass or more, detergency may be improved sufficiently. If the impregnation ratio is 900% or less, white residue may be reduced effectively.

[0059] In addition, from the viewpoint of the retention of the detergent composition, the basis weight before impregnating with a liquid detergent composition for hard surfaces is preferably 30 g/m² or more, more preferably 40 g/m² or more, further preferably 50 g/m² or more, and preferably 200 g/m² or less, more preferably 150 g/m² or less.

[0060] When a cleaning sheet for hard surfaces is manufactured by making the dry

substrate be impregnated with the detergent composition of the present invention just before use, from the viewpoint of reducing white residue and improving detergency, the impregnation ratio may be adjusted as needed. That is, the amount of the detergent composition is determined as needed, and the substrate is impregnated in it so that the cleaning sheet for hard surfaces of the present invention is formed.

[0061] [Cleaning Method for Hard Surface]

The present invention provides a cleaning method for hard surface, which is to wipe and clean hard surfaces after applying the detergent composition to hard surfaces.

[0062] As hard surfaces that may be wiped and cleaned in the present invention, it is not particularly limited, and one or more solid hard surfaces selected from glass, pottery, porcelain, plastic and stainless steel may be exemplified. The “hard surfaces” is not limited to plane or three-dimensional, and it refers to a surface that maintains a certain shape, and as long as it may be cleaned, its degree of hardness is not limited.

[0063] The object of the present invention is a hard surface, and specifically, an article with a hard surface. As an article with hard surfaces, a stove, a range hood, a wall, a workbench, a cabinet, a microwave oven, a refrigerator interior, a door frame, a door handle, a dining table, a floor, a shelf, a window, a furniture, a mirror, a door, a remote control, a toilet, a toilet seat, a wash basin, a bathtub, a kitchen sink, window glass, a tap, children's products (a high chair, a toy, a game pad), and the like may be exemplified.

[0064] As a method which is to wipe and clean hard surfaces after applying the detergent composition of the present invention to hard surfaces, the method of following (i)~(ii) may be exemplified.

(i) a method of wiping and cleaning hard surfaces after spraying or coating the detergent composition onto hard surfaces;

(ii) a method of wiping and cleaning hard surfaces using a cleaning sheet for hard surfaces containing the detergent composition of the present invention.

[0065] In the above (i) method, the method to spray or coat the detergent composition onto hard surfaces may be selected according to the width (area) of hard surfaces, and the like

appropriately. The following method is preferred: after spraying the detergent composition of the present invention onto hard surfaces by sprayer, or extruding the detergent composition of the present invention from an eject container such as a sprayer, a plastic squeeze bottle, and the like onto hard surfaces, or dripping the detergent composition of the present invention onto hard surfaces by dropper, wipe and clean hard surfaces with sponge, paper towel, non-woven fabric, woven fabric, weaving cloth, and the like, so as to remove the detergent composition applied to hard surfaces from hard surfaces to achieve the effect of cleaning and removing dirt.

[0066] Further, in the above (i) method, from the viewpoint of improving detergency, after spraying or coating, the retention time of the detergent composition of the present invention on hard surfaces is preferably 0.5 minutes or more, more preferably 1 minute or more, and preferably 10 minutes or less, and then wipe and clean hard surfaces.

[0067] In the above (ii) method, wipe and clean hard surfaces by using at least one cleaning sheet selected from a cleaning sheet for hard surfaces impregnated with the detergent composition of the present invention in advance, and a cleaning sheet for hard surfaces made by impregnating a dry substrate with the detergent composition of the present invention by spraying or extruding just before use, so as to achieve the effect of cleaning and removing dirt.

[0068] Further, a cleaning sheet of hard surfaces may be equipped on the cleaning tool for wiping, or may be directly held by hand for wiping.

[0069] The above (i)~(ii) methods may be used separately, and may be also used in combination. In the case of using in combination, for example, when wiping and cleaning with a cleaning sheet for hard surfaces, the detergent composition of the present invention can be sprayed or extruded onto hard surfaces to wipe at the same time. By using these methods in combination, the effect of cleaning and removing dirt is improved.

[0070] After wiping and cleaning hard surfaces by the above (i) method and/ or (ii) method, it is possible to wash using water further as needed.

[0071] From the viewpoint of improving detergency and reducing white residue, when

wiping and cleaning hard surfaces, the temperature of the detergent composition of the present invention is preferably 5°C or more, more preferably 10°C or more, further preferably 15°C or more, and is preferably 50°C or less, more preferably 40°C, further preferably 30°C or less.

[0072] <Embodiments of the Present Invention>

Embodiments of the present invention will be exemplified below. In these embodiments, the matters described in the detergent composition, the cleaning sheet for hard surfaces and the cleaning method for hard surface can be applied appropriately.

[0073] <1> A detergent composition, containing following components (A)~(D),

(A): a polyoxyethylene glycerol fatty acid ester, which has an oxyethylene group having an average added mole number of 10 moles or less, and has a linear or branched saturated or unsaturated fatty acyl group having 12 or less carbon atoms;

(B): water;

(C): a surfactant which has an alkyl group or an alkenyl group having 8 to 18 carbon atoms other than the component (A); and

(D): one or more components selected from a component (D1) and a component (D2):

(D1): an organic acid or its salt,

(D2): an inorganic salt,

in the detergent composition, a content of the component (A) is 0.35% by mass or more and 5% by mass or less, and when a content of the component (D1) is calculated as acid, and a content of the component (D2) is calculated as salt, a content of the component (D) is 0.005% by mass or more and 0.4% by mass or less, and as a total content of the component (A) and the component (C), (A)+(C) is 10% by mass or less.

[0074] <2> The liquid detergent composition of the above <1>, wherein the component (A) may contain 1 or more and 3 or less fatty acyl groups.

[0075] <3> The liquid detergent composition of the above <1> or <2>, wherein as a source of a fatty acid ester of the component (A), the fatty acid has preferably 8 or more and

12 or less, more preferably 8 or more and 10 or less carbon atoms.

[0076] <4> The liquid detergent composition according to any one of the above <1> ~ <3>, wherein as a fatty acid, one or more fatty acids are selected from various octanoic acids, various nonanoic acids, various decanoic acids, various undecanoic acids and various dodecanoic acids.

[0077] <5> The liquid detergent composition according to any one of the above <1> ~ <4>, wherein in the component (A), the average added mole number of an oxyethylene group is preferably more than 0 moles, more preferably 4 moles or more, further preferably 6 moles or more, and is preferably 9 moles or less, more preferably 8 moles or less.

[0078] <6> The liquid detergent composition according to any one of the above <1> ~ <5>, wherein the component (A) is one or two components selected from a polyoxyethylene glycerol (octanoic acid/ decanoic acid) ester (average added mole number of the oxyethylene group is 6 moles), and a polyoxyethylene glycerol laurate (average added mole number of the oxyethylene group is 8 moles).

[0079] <7> The liquid detergent composition according to any one of the above <1> ~ <6>, wherein in the detergent composition, a content of the component (A) is 0.35% by mass or more, preferably 0.4% by mass or more, more preferably 0.5% by mass or more, further preferably 0.7% by mass or more, further preferably 0.8% by mass or more, much further preferably 1% by mass or more, and is 5% by mass or less, preferably 2.6% by mass or less, more preferably 1.3% by mass or less, further preferably 1.1% by mass or less.

[0080] <8> The liquid detergent composition according to any one of the above <1> ~ <7>, wherein in the detergent composition, a content of the component (B) is 85% by mass or more, more preferably 90% by mass or more, further preferably 95% by mass or more, much further preferably 96% by mass or more, and is 99% by mass or less, preferably 98% by mass or less.

[0081] <9> The liquid detergent composition according to any one of the above <1> ~ <8>, wherein the component (C) is one or more surfactants selected from (C1) a non-ionic surfactant, (C2) an amphoteric surfactant, and (C3) a cationic surfactant.

- [0082]** <10> The liquid detergent composition of the above <9>, wherein the component (C1) is one or more non-ionic surfactants selected from an alkyl glycoside, a polyoxyethylene alkyl ether and a polyoxyethylene alkenyl ether, preferably an alkyl glycoside.
- [0083]** <11> The liquid detergent composition of the above <9>, wherein the component (C2) is one or more amphoteric surfactants selected from an amine oxide and a betaine, preferably an amine oxide.
- [0084]** <12> The liquid detergent composition of the above <9>, wherein the component (C3) is a mono-long chain or di-long chain alkyl quaternary ammonium salt as a cationic surfactant.
- [0085]** <13> The liquid detergent composition according to any one of the above <1>~<12>, wherein in the detergent composition, a content of the component (C) is 0.02% by mass or more, preferably 0.03% by mass or more, and is 5% by mass or less, preferably 3% by mass or less, more preferably 1% by mass or less, further preferably 0.2% by mass or less, much further preferably 0.1% by mass or less.
- [0086]** <14> The liquid detergent composition according to any one of the above <1>~<13>, wherein a total content of the component (A) and the component (C) ((A)+(C)) is 10% by mass or less, preferably 3% by mass or less, preferably 2% by mass or less, more preferably 1.8% by mass or less, and further preferably 1.5% by mass or less, and is preferably 0.5% by mass or more, more preferably 0.8% by mass or more, further preferably 1% by mass or more.
- [0087]** <15> The liquid detergent composition according to any one of the above <1>~<14>, wherein the mass ratio of the component (A) to the component (C), which is calculated as (A)/(C), is 70 or less, preferably 60 or less, more preferably 20 or less, more preferably 10 or less, further preferably 8 or less, much further preferably 7 or less, and is 2 or more, preferably 3 or more, more preferably 4 or more, further preferably 5 or more.
- [0088]** <16> The liquid detergent composition according to any one of the above <1>~<15>, wherein the component (D1) is one or more components selected from a citric

acid, a monosodium citrate, a disodium citrate, a trisodium citrate, a monopotassium citrate, a dipotassium citrate, a tripotassium citrate, an ethylenediamine tetraacetic acid, a disodium ethylenediamine tetraacetate, a trisodium ethylenediamine tetraacetate, a dipotassium ethylenediamine tetraacetate, a tripotassium ethylenediamine tetraacetate, an ethylene glycol bis(2-aminoethyl ether) tetraacetic acid, a disodium ethylene glycol bis(2-aminoethyl ether) tetraacetate, a trisodium ethylene glycol bis(2-aminoethyl ether) tetraacetate, a dipotassium ethylene glycol bis(2-aminoethyl ether) tetraacetate, a tripotassium ethylene glycol bis(2-aminoethyl ether) tetraacetate, a sodium benzoate, and a potassium benzoate.

[0089] <17> The liquid detergent composition according to any one of the above <1>~<15>, wherein an inorganic salt of the component (D2) is one or more components selected from a sodium chloride, a potassium chloride, a magnesium chloride, a calcium chloride, an aluminum chloride, a sodium sulfate, a potassium sulfate, a magnesium sulfate, an aluminum sulfate, a sodium silicate, a sodium carbonate, a potassium carbonate, a sodium bicarbonate, and a potassium bicarbonate.

[0090] <18> The liquid detergent composition according to any one of the above <1>~<17>, wherein in the detergent composition, when the component (D) is the component (D1), a content of the component (D1), which is calculated as acid, is 0.005% by mass or more, preferably 0.007% by mass or more, more preferably 0.01% by mass or more, further preferably 0.03% by mass or more, and is 0.4% by mass or less, more preferably 0.3% by mass or less, further preferably 0.2% by mass or less.

When the component (D) is the component (D2), a content of the component (D2), which is calculated as salt, is 0.005% by mass or more, and is 0.4% by mass or less, more preferably 0.3% by mass or less, further preferably 0.2% by mass or less.

When the component (D) is the combination of the component (D1) and the component (D2), the content of the component (D1) is calculated as acid, and the content of the component (D2) is calculated as salt, the content of the component (D) is 0.005% by mass or more, preferably 0.007% by mass or more, more preferably 0.01% by mass or more, further preferably 0.03% by mass or more, and is 0.4% by mass or less, more preferably

0.3% by mass or less, further preferably 0.2% by mass or less.

[0091] <19> The liquid detergent composition according to any one of the above <1>~<17>, wherein in the detergent composition, the component (D) is one or more components preferably selected from the organic acid or its salt of the component (D1).

[0092] <20> A cleaning sheet for hard surfaces, containing the detergent composition of any one of the above <1>~<19>.

[0093] <21> The cleaning sheet for hard surfaces according to the above <20>, wherein the cleaning sheet for hard surfaces of the present invention is obtained by making a substrate be impregnated with the detergent composition of the present invention in advance, or by making the dry substrate be impregnated with the detergent composition of the present invention just before use.

[0094] <22> The cleaning sheet for hard surfaces according to the above <20> or <21>, wherein the ratio of the mass of the detergent composition to the mass of the substrate [that is, (the mass of the detergent composition/the mass of the substrate in the non-impregnated state (the dry state)) $\times 100$], that is, the impregnation ratio, is preferably 100% by mass or more, more preferably 150% by mass or more, and preferably 900% by mass or less, more preferably 400% by mass or less, further preferably 350% by mass or less.

[0095] <23> The cleaning sheet for hard surfaces according to any one of the above <20>~<22>, wherein the basis weight before impregnating with a liquid detergent composition for hard surfaces is preferably 30 g/m² or more, more preferably 40 g/m² or more, further preferably 50 g/m² or more, and preferably 200 g/m² or less, more preferably 150 g/m² or less.

[0096] <24> A cleaning method for hard surface, including applying the detergent composition of any one of the above <1> ~ <19> to hard surface for cleaning.

[0097] <25> The cleaning method for hard surface according to the above <24>, wherein the object of the cleaning method for hard surfaces is a hard surface, and as an article with a hard surface, it may be a stove, a range hood, a wall, a workbench, a cabinet, a microwave oven, a refrigerator interior, a door frame, a door handle, a dining table, a floor, a

shelf, a window, a furniture, a mirror, a door, a remote control, a toilet, a toilet seat, a wash basin, a bathtub, a kitchen sink, window glass, a tap, children's products (a high chair, a toy, a game mat).

[0098] <26> The cleaning method for hard surface according to the above <24> or <25>, wherein the cleaning method for hard surfaces is any one of the following (i)~(ii),

(i) the method of wiping and cleaning hard surfaces after spraying or coating the detergent composition onto hard surfaces;

(ii) the method of wiping and cleaning hard surfaces by using a cleaning sheet for hard surfaces containing the detergent composition of the present invention.

EXAMPLES

[0099] Examples and Comparative Examples are shown below. The Examples are given to illustrate the embodiments of the present invention and are not to be construed as limitations of the present invention.

[0100] In addition, in the case of “%” marked as below separately, unless otherwise indicated, it means “% by mass”.

[0101] Examples 1~33 and Comparative Examples 1~2

The detergent compositions illustrated in Tables 1~4 were prepared by using the following ingredients, and the following items were evaluated. The results were shown in Table 1~4.

[0102] [Detergency]

Detergency against denatured grease stains was evaluated.

A 0.02g rapeseed oil was applied evenly on one surface of a stainless steel sheet (70mm×25mm) ($1/2 \leq$ (an application area/an area of one surface of the stainless steel sheet) $\leq 3/4$). It was placed in a 170 °C holding furnace for 0.5h, and then cooled to room temperature and weighed, and the weight was calculated as W1.

Several pieces of non-woven fabric with length and width of 100mm×70mm (the substrate was synthetic fiber, and the basis weight was $40 \pm 4 \text{g/m}^2$, Daiwa Textile Co.,

Ltd.) were cut out, and a 1ml detergent composition of each of Examples and Comparative Examples of Tables 1~4 was dripped on the non-woven fabric, and a cleaning sheet for hard surfaces ([the mass of the detergent composition/the mass of the substrate in the non-impregnated state (in the dry state)] $\times 100=320\%$ by mass) was manufactured. Then, it was wrapped on an eraser (15mm $\times$ 40mm $\times$ 10mm) wrapped in an aluminum foil.

The surface (15mm $\times$ 40mm) of the eraser wrapped with the cleaning sheet impregnated with the detergent composition of Example 1 was used to wipe the stainless-steel surface once. After waiting for 10 minutes, the stainless-steel sheet was weighed again, and the weight was calculated as W2.

The stains on the stainless-steel sheet were completely removed, and dried and weighed, and the weight was calculated as W0.

$$\text{Detergency} = [(W1-W2)/(W1-W0)] * 100(\%)$$

W0, W1 and W2 were calculated by taking 5 digits after the decimal point during measurement. Record the calculation results in a table.

Then, the above operation was repeated, and the remaining Examples/Comparative Examples in Tables 1~4 were completed by using the same wiping method as in Example 1.

[0103] [White Residue]

White residue after cleaning hard surfaces was evaluated.

A piece of cleaned glass plate (China Taiwan Glass Industry Co., Ltd., and the size is 30cm $\times$ 30cm $\times$ 0.5cm) was taken.

Non-woven fabric (the substrate was synthetic fiber, and the basis weight was 40 $\pm$ 4g/m², Daiwa Textile Co., Ltd.) was cut into several pieces of 20cm $\times$ 14cm size. For these non-woven fabric pieces, each of them were add dropwise with 4ml detergent composition of each of Examples and Comparative Examples of Tables 1~4 to prepare a cleaning sheet for hard surfaces ([the mass of the detergent composition/the mass of the substrate in the non-impregnated state (in the dry state)] $\times 100=320\%$ by mass).

Either surface of the glass plate was wiped by using this cleaning sheet (from

one edge of the glass plate to the other edge), and the wiping was performed back and forth 10 times until the liquid soaked the whole glass. Then, photos were taken of the wiped glass plate and these images were processed (using ImageJ), and the remaining area of white residue on the glass plate was measured, and the residual ratio of white residue based on the processing area of the glass plate was calculated, and the following criteria was used for evaluation.

Evaluation criteria for white residue

++: the residual ratio was 50% or less

+: the residual ratio was more than 50% and less than 70%

-: the residual ratio was 70% or more

[0104] Also, the contents of the ingredients in Tables 1~4 (% by mass) were values based on active components. Each ingredient used in Examples and Comparative Examples were collectively shown below. Additionally, the content of the component (D1) (% by mass) is a value calculated as acid based on active components. The content of the component (D2) (% by mass) is a value calculated as salt based on active components.

[0105] <Component (A)>

- Polyoxyethylene glycerol (octanoic acid/ decanoic acid) ester (the trade name “TEGOSOFT GMC6”, manufactured by Evonik Nutrition & Care GmbH, and the content of active components was 100%)

[0106] <Component (C)>

- (C1): C₁₀₋₁₆ alkyl glycoside (the trade name “MAYDOL 12”, manufactured by Kao Corporation, and the content of effective components was 40%)
- (C2): Lauryl dimethylamine oxide (the trade name “Amphitol 20N”, manufactured by Kao Corporation, and the content of active components was 35%)
- (C3): Benzyl-C₁₂₋₁₆-alkyl dimethylammonium chloride (the trade name “Sanisol B50”, manufactured by Kao Corporation, and the content of active components was 50.8%)

[0107] <Component (D)>

· (D1): Disodium ethylenediamine tetraacetate dihydrate (manufactured by Nagase Chemtex Corporation), the calculation formula of its content (m) calculated as acid was illustrated as follows:

the molecular weight of EDTA.2Na.2H₂O: 372.25g/mol,

the molecular weight of EDTA: 292.24g/mol,

$$m_{(\text{EDTA})} = m_{(\text{EDTA.2Na.2H}_2\text{O})} * 292.24/372.25.$$

· (D1): Citric acid monohydrate (manufactured by Fuso Chemical Co., Ltd.),

the calculation formula of its content (m) calculated as acid was illustrated as follows:

the molecular weight of citric acid: 192.13g/mol,

the molecular weight of citric acid monohydrate: 210.14g/mol,

$$m_{(\text{citric acid})} = m_{(\text{citric acid monohydrate})} * 192.13/210.14.$$

· (D2): Aluminum chloride (AlCl₃)

[0108]

<Other Components>

· Methylparaben (manufactured by Ueno Fine Chemicals Industry, Ltd., and the content of active components was 100%)

· Ethanol (manufactured by GODO SHUSEI CO., Ltd., and the content of active components was 95%)

[0109]

Table 1

Ingredients (% by mass)			Comparative Example 1	Comparative Example 2	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6	Example 7
A		Polyoxyethylene glycerol (octanoic acid/ decanoic acid) ester	0.1	0.3	0.42	0.5	0.7	0.8	0.95	1	1.05
D	D1	Disodium ethylenediamine tetraacetate dihydrate (content calculated as acid)	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785
C	C1	C ₁₀₋₁₆ alkyl glycoside	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	C2	Lauryl dimethylamine oxide	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
	C3	Benzyl-C ₁₂₋₁₆ -alkyl dimethylammonium chloride	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other components		Methylparaben	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		Ethanol	2	2	2	2	2	2	2	2	2
		Fragrance	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
B	Water		97.397	97.197	97.077	96.997	96.797	96.697	96.547	96.497	96.447
Total			100	100	100	100	100	100	100	100	100
A+C (total content)			0.263	0.463	0.583	0.663	0.863	0.963	1.113	1.163	1.213
A/C (mass ratio)			0.61	1.84	2.58	3.07	4.29	4.91	5.83	6.13	6.44
Evaluation	White residue		++	++	++	++	++	++	++	++	++
	Detergency		28%	41%	62%	66%	72%	75%	76%	78%	79%

[0110]

Table 2

Ingredients (% by mass)			Example 8	Example 9	Example 10	Example 11	Example 12	Example 13	Example 14	Example 15
A		Polyoxyethylene glycerol (octanoic acid/ decanoic acid) ester	1.1	1.2	1.3	1.4	1.6	1.7	1.9	2.6
D	D1	Disodium ethylenediamine tetraacetate dihydrate (content calculated as acid)	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785
C	C1	C ₁₀₋₁₆ alkyl glycoside	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	C2	Lauryl dimethyl amine oxide	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
	C3	Benzyl-C ₁₂₋₁₆ -alkyl dimethyl ammonium chloride	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other components		Methylparaben	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		Ethanol	2	2	2	2	2	2	2	2
		Fragrance	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
B		Water	96.397	96.297	96.197	96.097	95.897	95.797	95.597	94.897
Total			100	100	100	100	100	100	100	100
A+C (total content)			1.263	1.363	1.463	1.563	1.763	1.863	2.063	2.763
A/C (mass ratio)			6.75	7.36	7.98	8.59	9.82	10.43	11.66	15.95
Evaluation	White residue		++	++	++	++	++	+	+	+
	Detergency		77%	74%	72%	64%	62%	64%	64%	63%

[0111]

Table 3

Ingredients (% by mass)		Example 16	Example 17	Example 18	Example 19	Example 20	Example 21
A		Polyoxyethylene glycerol (octanoic acid/ decanoic acid) ester	1	1.6	1.6	1.6	1.6
D	D1	Citric acid monohydrate(content calculated as acid)	0.137	0.137	0.137	0.137	0.137
C	C1	C ₁₀₋₁₆ alkyl glycoside	0.05	0.025	0.0123	0.0098	0.0082
	C2	Lauryl dimethylamine oxide	0.013	0.006	0.0032	0.0026	0.0021
	C3	Benzyl-C ₁₂₋₁₆ -alkyl dimethylammonium chloride	0.1	0.049	0.0245	0.0196	0.0164
Other components		Ethanol	0.04	0.04	0.04	0.04	0.04
		Fragrance	2	2	2	2	2
B		Water	96.65	96.13	96.17	96.18	96.18
Total			100	100	100	100	100
A+C (total content)			1.163	1.68	1.64	1.632	1.6267
A/C (mass ratio)			6.13	20.00	40.00	50.00	60.00
Evaluation		White residue	++	++	++	++	++
		Detergency	78%	62%	63%	64%	61%

[0112] Table 4

Ingredients (% by mass)			Example 22	Example 23	Example 24	Example 25	Example 26	Example 27	Example 28	Example 29	Example 30	Example 31	Example 32	Example 33
A		Polyoxyethylene glycerol (octanoic acid/decanoic acid) ester	1	1	1	1	1	1	1	1	1	1	1	1
D	D1	Disodium ethylenediamine tetraacetate dihydrate (content calculated as acid)	0.00785	0.039	0.047	0.063	0.071	0.0785	0.1177	0.157	0.196	0.2355		
		Citric acid monohydrate (content calculated as acid)											0.4	
	D2	AlCl ₃												0.16
C	C1	C ₁₀₋₁₆ alkyl glycoside	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	C2	Lauryl dimethylamine oxide	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
	C3	Benzyl-C ₁₂₋₁₆ -alkyl ammonium chloride dimethyl	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other components	Methylparaben		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Ethanol		2	2	2	2	2	2	2	2	2	2	2	2
	Fragrance		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
B		Water	96.587	96.547	96.537	96.517	96.507	96.497	96.447	96.397	96.347	96.297	96.297	BL
Total			100	100	100	100	100	100	100	100	100	100	100	100
A+C (total content)			1.163	1.163	1.163	1.163	1.163	1.163	1.163	1.163	1.163	1.163	1.163	1.163
A/C (mass ratio)			6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13
Evaluation	White residue		+++	++	++	++	++	++	+	+	+	+	+	+
	Detergency		68%	72%	74%	79%	81%	78%	83%	83%	81%	75%	81%	72%

[0113] In Tables 1 and 2, according to the results of Examples 1~7 and Comparative Examples 1~2, when the component (A) was formulated to the detergent composition of the present invention, if the content of the component (A) was in the scope of the present invention, detergency was improved.

[0114] In Table 3, according to the results of Examples 16~21, when the component (A) and the component (C) were formulated to the detergent composition of the present invention, if the mass ratio of the component (A) to the component (C) ((A)/(C)) was in the scope of the present invention, detergency was improved.

[0115] In Table 4, according to the results of Examples 22~33, when as the component (D), the component (D1) and/or the component (D2) were formulated to the detergent composition of the present invention, and the component (D1) was calculated as acid, and the component (D2) was calculated as salt, if the mass ratio of the content of the component (D) was in the scope of the present invention, white residue was reduced.

CLAIMS

[Claim 1] A detergent composition, comprising:

following components (A)~(D),

(A): a polyoxyethylene glycerol fatty acid ester, which has an oxyethylene group having an average added mole number of 10 moles or less, and has a linear or branched saturated or unsaturated fatty acyl group having 12 or less carbon atoms;

(B): water;

(C): a surfactant which has an alkyl group or alkenyl group having 8 to 18 carbon atoms other than the component (A); and

(D): one or more components selected from a component (D1) and a component (D2):

(D1): an organic acid or its salt,

(D2): an inorganic salt,

wherein a content of the component (A) is 0.35% by mass or more and 5% by mass or less, and when a content of the component (D1) is calculated as acid, and a content of the component (D2) is calculated as salt, a content of the component (D) is 0.005% by mass or more and 0.4% by mass or less, and as a total content of the component (A) and the component (C), (A)+(C) is 10% by mass or less.

[Claim 2] The detergent composition according to claim 1, wherein

the content of the component (A) is 0.35% by mass or more and 2.6% by mass or less.

[Claim 3] The detergent composition according to claim 1, wherein

the content of the component (A) is 0.35% by mass or more and 1.3% by mass or less.

[Claim 4] The detergent composition according to claim 1, wherein

the content of the component (B) is 85% by mass or more.

[Claim 5] The detergent composition according to any one of claims 1 to 4, wherein
as the total content of the component (A) and the component (C), (A)+(C) is 3% by mass
or less.

[Claim 6] The detergent composition according to any one of claims 1 to 5, wherein
as a mass ratio of the content of the component (A) to the content of the component (C),
(A)/(C) is 70 or less.

[Claim 7] The detergent composition according to any one of claims 1 to 5, wherein
as the mass ratio of the content of the component (A) to the content of the component (C),
(A)/(C) is 8 or less.

[Claim 8] The detergent composition according to any one of claims 1 to 7, wherein
as the mass ratio of the content of the component (A) to the content of the component (C),
(A)/(C) is 3 or more.

[Claim 9] The detergent composition according to any one of claims 1 to 7, wherein
as the mass ratio of the content of the component (A) to the content of the component (C),
(A)/(C) is 4 or more.

[Claim 10] The detergent composition according to any one of claims 1 to 9, wherein
a fatty acid source of the component (A) is one or more acids selected from an octanoic
acid, a nonanoic acid, a decanoic acid, an undecanoic acid and a dodecanoic acid.

[Claim 11] The detergent composition according to any one of claims 1 to 10, wherein
the surfactant of the component (C) is one or more surfactants selected from (C1) a
nonionic surfactant, (C2) an amphoteric surfactant and (C3) a cationic surfactant.

[Claim 12] The detergent composition according to any one of claims 1 to 11, wherein
the component (D) is one or more components selected from the component (D1) an
organic acid or its salt.

[Claim 13] A cleaning sheet for hard surfaces comprising:
the detergent composition of any one of claims 1 to 12

[Claim 14] A cleaning method for hard surface comprising:
applying the detergent composition of any one of claims 1 to 12 to hard surfaces for
cleaning.