

DESCRIPTION

LIQUID DETERGENT FOR KITCHEN

TECHNICAL FIELD

5 [0001]

The present invention relates to a liquid detergent for use in kitchen.

Priority is claimed on Japanese Patent Application No. 2016-129644, filed June 30, 2016, the contents of which are incorporated herein by reference.

10 BACKGROUND ART

[0002]

There are some methods for cleaning kitchen utensils such as tableware and cooking utensils, the examples of which include a method in which a liquid detergent for use in kitchen (hereinafter also simply referred to as "detergent") is added to a
15 water-soaked cleaning tool such as a sponge, and an object to be cleaned is rub-washed with the cleaning tool, a method in which a detergent is diluted with water to prepare a cleaning liquid, and an object to be cleaned is rub-washed with a cleaning tool such as a sponge while immersing the object in the cleaning liquid, and a method in which an
20 object to be cleaned is rub-washed with a cleaning tool such as a sponge which is impregnated with a cleaning liquid prepared by diluting a detergent with water.

Therefore, detergents are required to show sufficient detergency whether the detergents are diluted with water or not. However, some detergents do not show good detergency when diluted with water even if such detergents show satisfactory detergency when used without being diluted with water.

25 [0003]

As a detergent with excellent detergency, for example, Patent Document 1 discloses a liquid detergent for use in kitchen containing a nonionic surfactant, a sulfuric acid ester salt of polyoxyethylene alkyl ether having a narrow ratio of 55 % by mass or more, an amphoteric or semipolar surfactant, a polyether-modified silicone and a hydrotrope agent.

Patent Document 2 discloses a liquid detergent for use in kitchen containing a compound having a specific structure in which at least one of an ethyleneoxy group and a propyleneoxy group is introduced into an alcohol, an anionic surfactant, an amphoteric or semipolar surfactant, and a polyether-modified silicone.

Patent Document 3 discloses a liquid detergent for use in kitchen containing an anionic surfactant, an amphoteric or semipolar surfactant, and a polyether-modified silicone.

Prior Art References

Patent Document

[0004]

Patent Document 1 : Japanese Patent Application Unexamined Publication No. 2010-37552

Patent Document 2 : Japanese Patent Application Unexamined Publication No. 2011-153233

Patent Document 3 : Japanese Patent Application Unexamined Publication No. 2010-18680

DISCLOSURE OF INVENTION

Problems to be Solved by the Invention

[0005]

Incidentally, kitchen utensils after washing may be visually observed or touched by hand to check whether there is any remaining dirt. Alternatively, kitchen utensils after washing may be smelled to check whether there is any remaining odor
5 from food and the like, thereby evaluating the dirt removal.

When kitchen utensils are cleaned with a detergent directly added to a cleaning tool, the cleaning of the kitchen utensils is consequently carried out with high concentration of the detergent, whereby problems related to detergency and remaining odor are less likely to occur. On the other hand, when kitchen utensils are cleaned
10 with a detergent diluted with water, the kitchen utensils are consequently washed with low concentration of the detergent, which may cause remaining odor such as food odor even if there is no problem of detergency.

Therefore, detergents are required to exhibit an excellent deodorizing power even when diluted with water, as well as sufficient detergency.

15 [0006]

The liquid detergent for use in kitchen described in Patent Document 1 is excellent in gentle feel to hand skin and transparent appearance as well as detergency.

The liquid detergent for use in kitchen described in Patent Document 2 is excellent in sustainability of foaming level and maintenance of elastic feel of sponge as
20 well as detergency, and is also unlikely to make a user to feel dryness of hand skin.

The liquid detergent for use in kitchen described in Patent Document 3 is excellent in sustainability of foaming level and transparency as well as detergency, and also has an effect of giving good feel to hand skin.

However, with the liquid detergents for use in kitchen described in Patent Documents 1 to 3, it is difficult to obtain a sufficient deodorizing effect when the liquid detergents are diluted with water.

[0007]

5 The present invention has been made in view of the above circumstances, and the object of the present invention is to provide a liquid detergent for use in kitchen which exhibits excellent detergency and deodorizing effect even when diluted with water.

10 Means to Solve the Problems

[0008]

The embodiments of the present invention are as follows.

[1] A liquid detergent for use in kitchen, comprising:

component (A): anionic surfactant comprising an alkylbenzene sulfonate

15 (A1),

component (B): at least one surfactant selected from the group consisting of an amphoteric surfactant and a semipolar surfactant,

component (C): a silicone compound having a polyether group, and

component (D): an inorganic salt of a divalent metal,

20 wherein a mass ratio [(component (A) + component (B))/component (C)] is 1 to 175.

[2] The liquid detergent for use in kitchen according to [1], wherein the component (A) includes an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1).

[3] The liquid detergent for use in kitchen according to [2], wherein a mass ratio [component (A1)/component (A2)] is 0.05 to 15.

[4] The liquid detergent for use in kitchen according to [2] or [3], wherein the component (A2) includes a compound represented by the following general formula

5 (2):



wherein R^2 is a linear or branched alkyl group having 8 to 18 carbon atoms, m is an average repeating number of PO and is a number satisfying $0 \leq m < 1$, n is an average repeating number of EO and is a number satisfying $0 \leq n \leq 4$, PO is a propyleneoxy group, EO is an ethyleneoxy group, M is a counter ion, and X is a valence of M.

[5] The liquid detergent for use in kitchen according to any one of [1] to [4], wherein a mass ratio [(component (A) + component (B))/divalent metal component contained in the liquid detergent for use in kitchen] is 15 to 600.

[6] The liquid detergent for use in kitchen according to any one of [1] to [5],
15 wherein the component (A1) includes an alkylbenzene sulfonate having a linear alkyl group having 10 to 14 carbon atoms.

[7] The liquid detergent for use in kitchen according to any one of [1] to [6], wherein the amphoteric surfactant is at least one betaine surfactant selected from the group consisting of an alkyldimethylaminoacetic acid betaine, a fatty acid amidopropyl dimethylaminoacetic acid betaine, an alkylhydroxysulfobetaine, and a
20 fatty acid amidopropylhydroxysulfobetaine.

[8] The liquid detergent for use in kitchen according to any one of [1] to [7], wherein the semipolar surfactant is at least one amine oxide surfactant selected from the group consisting of an alkyldimethylamine oxide and
25 alkanoylamidoalkyldimethylamine oxide.

[9] The liquid detergent for use in kitchen according to any one of [1] to [8], wherein the component (D) includes at least one compound selected from the group consisting of magnesium salt and zinc salt.

[10] The liquid detergent for use in kitchen according to [4], wherein the
 5 compound represented by the general formula (2) is at least one compound selected from the group consisting of polyoxyethylene alkyl ether sulfuric acid ester salts and alkyl ether sulfuric acid ester salts.

Effect of the Invention

10 [0009]

The liquid detergent for use in kitchen according to the present invention exhibits excellent detergency and deodorizing effect even when diluted with water.

DESCRIPTION OF THE EMBODIMENTS

15 [0010]

Hereinbelow, the present invention will be described in detail.

The liquid detergent for use in kitchen (which may be hereinafter simply referred to as "detergent") of the present invention includes the following components (A), (B), (C), and (D).

20 [0011]

<Component (A)>

The component (A) is an anionic surfactant.

The component (A) includes an alkylbenzene sulfonate (hereinafter also referred to as "component (A1)") as an essential component. The component (A) preferably further

includes an anionic surfactant (hereinafter also referred to as "component (A2)") other than the component (A1).

[0012]

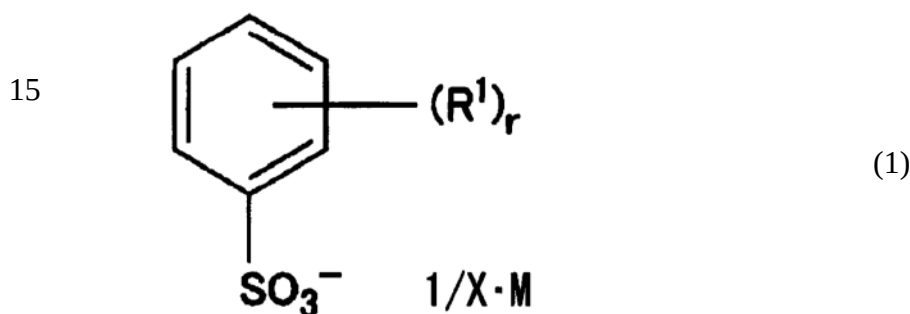
(Component (A1))

5 The component (A1) is an alkylbenzene sulfonate (A1).

By using the component (A1) in combination with the component (B), the component (C) and the component (D) which will be described later, the detergent exhibits excellent detergency and deodorizing power against odor derived from food materials even when the detergent is diluted with water.

10 One example of the component (A1) is a compound represented by the following general formula (1):

[0013]



[0014]

20 In the formula (1), R^1 is a linear or branched alkyl group having 8 to 18 carbon atoms, r is a number of 1 to 3, M is a counter ion, and X is the valence of M .

[0015]

R^1 is a linear or branched alkyl group having 8 to 18 carbon atoms, preferably a linear alkyl group. The carbon number of R^1 is preferably 10 to 14. Examples of
25 the alkyl group having 8 to 18 carbon atoms of R^1 include an octyl group, a nonyl

group, a decyl group, an undecyl group, a dodecyl group, a tridecyl group, a tetradecyl group, a pentadecyl group, a hexadecyl group, a heptadecyl group, and an octadecyl group.

In the formula (1), r is a number of 1 to 3, preferably 1 or 2. When r is 2 or more, the multiple R^1 groups may be the same or different.

M is a counter ion. Examples of M include cations of alkali metals, alkaline earth metals, ammonium, and alkanol amines. Specific examples thereof include cations of alkali metals such as sodium and potassium; cations of alkaline earth metals such as calcium and magnesium; ammonium ion, monoethanolamine, diethanolamine, triethanolamine and the like. Among these, alkali metal cations are preferable, and sodium ion is particularly preferable.

X is the valence of M .

With respect to the component (A1), a single type thereof may be used individually or two or more types thereof may be used in combination.

[0016]

(Component (A2))

The component (A2) is an anionic surfactant other than the component (A1).

By using the component (A1) in combination with the component (A2), the detergent exhibits further improved detergency and deodorizing power even when diluted with water.

[0017]

Examples of the component (A2) include α -sulfo fatty acid alkyl ester salts, α -olefin sulfonate salts, linear or branched alkyl ether sulfate salts, linear or branched alkenyl ether sulfate salts, linear or branched alkane sulfonate salt, polyoxyethylene alkyl ether sulfate salt, and the like. Examples of the salts include alkali metal salts

such as sodium salts and potassium salts, and alkanolamine salts such as monoethanolamine salts and diethanolamine salts.

Among these, preferred example is at least one compound selected from the group consisting of polyoxyethylene alkyl ether sulfuric acid ester salts and alkyl ether sulfuric acid ester salts, which are compounds represented by the following general formula (2), because good foaming can be achieved.



[0018]

wherein R^2 is a linear or branched alkyl group having 8 to 18 carbon atoms, m represents an average repeating number of PO and is a number satisfying $0 \leq m < 1$, n represents an average repeating number of EO and is a number satisfying $0 \leq n \leq 4$, PO represents a propyleneoxy group, EO represents an ethyleneoxy group, M is a counter ion, and X is a valence of M.

[0019]

R^2 is a linear or branched alkyl group having 8 to 18 carbon atoms. The carbon number of R^2 is preferably 10 to 16, and more preferably 12 to 14. The alkyl group as R^2 is preferably an alkyl group derived from vegetable fats and oils from the viewpoint of detergency and environment. Preferred examples of the fats and oils as a raw material include palm kernel oil, coconut oil and the like.

In the formula (2), m represents an average repeating number of PO (i.e., average number of moles of added propylene oxide) and is a number satisfying $0 \leq m < 1$, preferably 0.

In the formula (2), n represents an average repeating number of EO (i.e., average number of moles of added ethylene oxide) and is a number satisfying $0 \leq n \leq 4$, preferably $0 \leq n \leq 2$.

When m and n are greater than 0, PO and EO in $-(\text{PO})_m(\text{EO})_n-$ may be arranged in the form of blocks or arranged randomly.

PO is a propyleneoxy group.

EO is an ethyleneoxy group.

5 In the formula (2), M is the same as M in the formula (1). As M, an alkali metal cation is preferable, and sodium ion is particularly preferable.

In the formula (2), X is the same as X in the formula (1).

[0020]

Specific examples of the component (A2) include polyoxyethylene (1) linear
 10 alkyl (C12) ether sulfate sodium salts, polyoxyethylene (2) linear alkyl (C12) ether sulfate sodium salts, polyoxyethylene (3) linear alkyl (C12) ether sulfate sodium salts, polyoxypropylene (0.4) polyoxyethylene (1.5) linear alkyl (C12) ether sulfate sodium salt, polyoxyethylene (1) linear alkyl (C12/14 = 75/25; derived from natural fats and oils) ether sulfate sodium salts, polyoxyethylene (2) linear alkyl (C12/14 = 75/25;
 15 derived from natural fats and oils) ether sulfate sodium salts, polyoxy ethylene (3) linear alkyl (C12/14 = 75/25; derived from natural fats and oils) ether sulfate sodium salts, polyoxypropylene (0.4) polyoxyethylene (1.5) linear alkyl (C12/14 = 75/25; derived from natural fats and oils) ether sulfate sodium salts, alkyl (C12) ether sulfate sodium salts, and the like.

20 Among these, preferred examples are polyoxyethylene (1) linear alkyl (C12/14 = 75/25; derived from natural fats and oils) ether sulfate sodium salts, polyoxyethylene (2) linear alkyl (C12/14 = 75/25; derived from natural fats and oils) ether sulfate sodium salts, polyoxy ethylene (3) linear alkyl (C12/14 = 75/25; derived from natural fats and oils) ether sulfate sodium salts, and alkyl (C12) ether sulfate

sodium salts, because the effects of the present invention are especially easily achievable.

With respect to the component (A2), a single type thereof may be used individually or two or more types thereof may be used in combination.

5 [0021]

Here, the number in each parenthesis added immediately after "oxyethylene" or "oxypropylene" means an average number of repeating ethyleneoxy groups or propyleneoxy groups. For example, "polyoxyethylene (1)" means that the average number of repeating ethyleneoxy groups is 1 (average number of moles of added
10 ethylene oxide is 1).

The description "C12/14 = 75/25; derived from natural fats and oils" means that the compound is a mixture of molecules having a linear alkyl group having 12 carbon atoms and molecules having a linear alkyl group having 14 carbon atoms with a mass ratio of 75/25, and that the linear alkyl groups are derived from natural fats and
15 oils.

[0022]

The mass ratio [component (A1) / component (A2)] (hereinafter also referred to as "A1/A2 ratio") is preferably from 0.05 to 15, more preferably from 0.2 to 4.5, more preferably 0.45 to 2.

20 When the A1/A2 ratio is within the above range, the deodorizing effect is further enhanced.

[0023]

When the component (A) includes the component (A2), the amount of the component (A1) is preferably from 1 to 30 % by mass, more preferably from 3 to 13 %
25 by mass, based on the total mass of the detergent. The amount of the component (A2)

is preferably from 1 to 30 % by mass, more preferably from 3 to 13 % by mass, based on the total mass of the detergent. The amount of the component (A) is preferably from 5 to 40 % by mass, more preferably from 10 to 30 % by mass, based on the total mass of the detergent.

5 When the amount of the component (A1) is not less than the above lower limit value, the detergency and the deodorizing effect are further enhanced. On the other hand, when the amount of the component (A1) is not more than the above upper limit value, the appearance stability of the detergent improves.

 When the amount of the component (A2) is not less than the above lower limit
10 value, the detergency and deodorizing effect are enhanced, and the foamability improves as well. On the other hand, when the amount of the component (A2) is not more than the above upper limit value, the viscosity is prevented from becoming excessively high and easily adjustable to an appropriate range.

 When the amount of the component (A) is not less than the above lower limit
15 value, the detergency and the deodorizing effect are further enhanced. On the other hand, when the amount of the component (A) is not more than the above upper limit value, the viscosity is prevented from becoming excessively high and easily adjustable to an appropriate range, and the appearance stability also improves.

[0024]

20 When the component (A) does not include the component (A2), the amount of the component (A1), i.e., the amount of the component (A), is preferably from 10 to 30 % by mass, more preferably from 15 to 25 % by mass, based on the total mass of the detergent.

 When the amount of the component (A1) is not less than the above lower limit
25 value, the detergency and the deodorizing effect are further enhanced. Further, the

appearance stability of the detergent also improves. On the other hand, when the amount of the component (A1) is not more than the above upper limit value, the appearance stability of the detergent improves.

[0025]

5 <Component (B)>

The component (B) is at least one surfactant selected from the group consisting of an amphoteric surfactant and a semipolar surfactant.

The "semipolar surfactant" means a surfactant having a semipolar bond (a bond having an intermediate nature between a nonpolar bond and a polar bond), which
10 becomes cationic, anionic or amphoteric depending on the pH of a solution or a dispersion in which the semipolar surfactant is to be dissolved or dispersed.

[0026]

For example, the amphoteric surfactant (hereinafter also referred to as "component (B1)") may be a betaine surfactant, and specific examples thereof include
15 an alkyldimethylaminoacetic acid betaine, a fatty acid amidopropyldimethylaminoacetic acid betaine, an alkylhydroxysulfobetaine, and a fatty acid amide propyl hydroxysulfobetaine.

Among these, a betaine amphoteric surfactant having an alkyl group having 8 to 22 carbon atoms is preferable. The carbon number is more preferably 10 to 18, and
20 more preferably 12 to 16. Examples of the alkyl group having 8 to 22 carbon atoms include an octyl group, a nonyl group, a decyl group, an undecyl group, a dodecyl group, a tridecyl group, a tetradecyl group, a pentadecyl group, a hexadecyl group, a heptadecyl group, an octadecyl group, a nonadecyl group, an icosyl group, a henicosyl group, a docosyl group and the like. Among these, a fatty acid (having 8 to 22 carbon
25 atoms) amidopropyldimethylaminoacetic acid betaine having an amide group, a fatty

acid (having 8 carbon atoms to 22) amidopropylhydroxysulfobetaine are preferred, because the detergent is likely to maintain good deodorizing power even when diluted with water.

As the fatty acid (having 8 to 22 carbon atoms)

- 5 amidopropyldimethylaminoacetic acid betaine, lauric acid
amidopropyldimethylaminoacetic acid betaine (for example, Energy Co L-30B (trade name), manufactured by Lion Corporation), coconut oil fatty acid
amidopropyldimethylaminoacetic acid betaine (for example, Tego Betain L7 (trade name), manufactured by Evonik Corporation) are more preferable.

- 10 With respect to the component (B1), a single type thereof may be used individually or two or more types thereof may be used in combination.

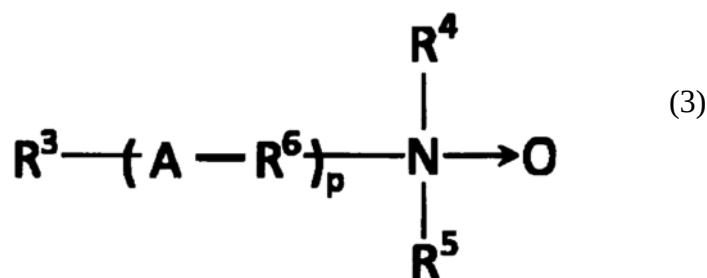
[0027]

- As the semipolar surfactant (hereinafter also referred to as "component (B2)"), for example, an amine alkylene oxide surfactant and an amine oxide surfactant can be
15 mentioned. Of these, an amine oxide surfactant is preferable.

Examples of the amine oxide surfactant include an alkylamine oxide, an alkylamidopropyldimethylamine oxide and the like, of which compounds represented by the following formula (3) are preferable.

[0028]

20



25

[0029]

In the formula (3), R^3 is a linear or branched alkyl group having 8 to 18 carbon atoms or a linear or branched alkenyl group having 8 to 18 carbon atoms, R^4 and R^5 are each independently an alkyl group having 1 to 3 carbon atoms or a hydroxyalkyl group having 1 to 3 carbon atoms, and R^6 is an alkylene group having 1 to 4 carbon atoms. In the formula (3), A is -CONH-, -NHCO-, -COO-, -OCO- or -O-, and p is a number of 0 or 1.

[0030]

R^3 is a linear or branched alkyl group having 8 to 18 carbon atoms or a linear or branched alkenyl group having 8 to 18 carbon atoms, and is preferably a linear or branched alkyl group having 8 to 18 carbon atoms. The carbon number of R^3 is preferably 10 to 14. As the alkyl group having 8 to 18 carbon atoms of R^3 , the alkyl groups exemplified above for R^1 can be mentioned.

R^4 and R^5 are each independently an alkyl group having 1 to 3 carbon atoms or a hydroxyalkyl group having 1 to 3 carbon atoms, and preferably an alkyl group having 1 to 3 carbon atoms, more preferably a methyl group. It is still more preferable that both of R^4 and R^5 are methyl groups.

R^6 is an alkylene group having 1 to 4 carbon atoms. Examples of the alkylene group having 1 to 4 carbon atoms as R^6 include a methylene group, an ethylene group, a propylene group, and a butylene group.

In the formula (3), A is -CONH-, -NHCO-, -COO-, -OCO- or -O-.

In the formula (3), p is a number of 0 or 1, preferably 0.

[0031]

Specific examples of the amine oxide surfactant include alkyldimethylamine oxides such as lauryldimethylamine oxide, cocoalkyldimethylamine oxide,

lauryldiethylamine oxide and the like; alkanoylamidoalkyldimethylamine oxides such as lauric acid amidopropylamine oxide and the like. Of these, alkyldimethylamine oxides are more preferable, since the detergency against oil stain is particularly good.

With respect to the component (B2), a single type thereof may be used
 5 individually or two or more types thereof may be used in combination.

[0032]

As the component (B), either one of the component (B1) or the component (B2) may be used, or the component (B1) and the component (B2) may be used in combination.

10 The amount of the component (B) is preferably from 0.05 to 5 % by mass, more preferably from 0.2 to 2% by mass, based on the total mass of the detergent.

When the amount of the component (B) is not less than the above lower limit value, the detergency and the deodorizing effect are further enhanced. On the other hand, when the amount of the component (B) is not more than the above upper limit
 15 value, the viscosity is prevented from becoming excessively high and is easily adjustable to an appropriate range.

[0033]

<Component (C)>

The component (C) is a silicone compound having a polyether group.

20 The component (C) is a silicone oil (polyether-modified silicone) in which a polyether group is introduced at the terminal or side chain of the dimethylpolysiloxane skeleton. The silicone oil may be modified with a substituent such as an amino group, an amide group or an alkyl group in addition to a polyether group.

The component (C) has a very high solubility in water and the like even if it is a molecule having a high molecular weight, as compared to a dimethylpolysiloxane having no polyether group.

[0034]

5 The weight average molecular weight of the component (C) is preferably from 2,000 to 30,000, more preferably from 5,000 to 25,000.

When the weight average molecular weight of the component (C) is not less than the above lower limit value, especially the detergency against oil stains is further enhanced. On the other hand, when the weight average molecular weight of the
10 component (C) is not more than the above upper limit value, the viscosity of the component (C) itself is prevented from becoming too high, so that the handling of the detergent improves.

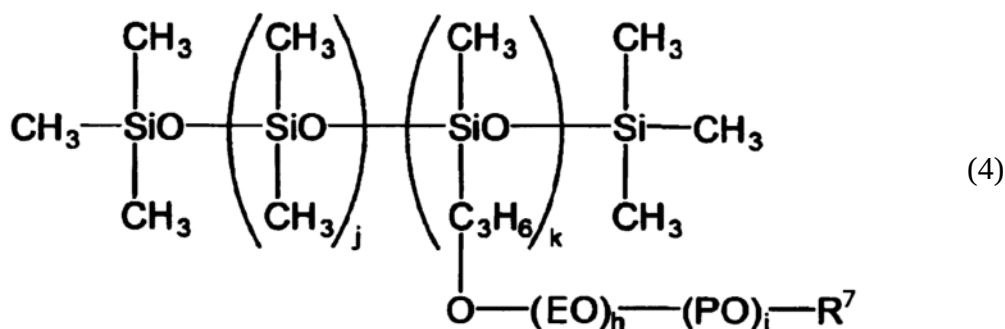
The weight average molecular weight of the component (C) is a value obtained by gel permeation chromatography (GPC) using polystyrene as a standard
15 substance.

[0035]

The molecular structure of the component (C) may be linear, branched, or crosslinked.

The component (C) may be, for example, a linear chain-modified type or a
20 side chain-modified type, and a side chain-modified type is preferable. As the side chain-modified type silicone compound, a compound represented by the following general formula (4) can be mentioned.

[0036]



5

[0037]

In the formula (4), R^7 is a hydrogen atom or an alkyl group; h is an average repeating number of EO and is a number satisfying $2 \leq h \leq 100$; i is an average repeating number of PO and is a number satisfying $0 \leq i \leq 50$; j is a number of 5 to 10,000; and k is a number of 1 to 1,000.

[0038]

R^7 is a hydrogen atom or an alkyl group. The alkyl group as R^7 is preferably an alkyl group having 1 to 4 carbon atoms, and more preferably a methyl group because of its good solubility in the detergent.

15

In the formula (4), h represents an average repeating number of EO (i.e., average number of moles of added ethylene oxide), and is a number satisfying $2 \leq h \leq 100$, preferably a number of 5 to 20 since the solubility in the detergent improves.

In the formula (4), i represents an average repeating number of PO (i.e., average number of moles of added propylene oxide), and is a number satisfying $0 \leq i \leq 50$, preferably a number of 0 to 10 since the solubility in the detergent improves.

20

In the formula (4), j represents an average polymerization degree of the dimethylsiloxane groups and satisfies $5 \leq j \leq 10,000$, more preferably $5 \leq j \leq 1,000$ since the solubility in the detergent improves.

In the formula (4), k represents an average polymerization degree of the methyl polyoxyalkylenepropyl siloxane groups and is a number satisfying $1 \leq k \leq 1,000$, preferably $1 \leq k \leq 50$ since the solubility in the detergent improves.

[0039]

5 Specific examples of the component (C) include products with the trade names of FZ-2233, FZ-2231, SILSTYLE 104, SILSTYLE 201, SILSTYLE 401, SH3771M, SH3773M, SH3772M, SH3775M, SH3748, SH3749, SF8410, SH8700, BY22-008, and SF8421, each manufactured by Dow Corning Toray Co., Ltd.; products with the trade names of KF352A, KF6008, KF615A, KF6016, and KF6017,
10 each manufactured by Shin-Etsu Chemical Co., Ltd.; and products with the trade names of TSF4450 and TSF4452, each manufactured by Momentive Performance Materials Japan Limited.

Among these, SH3771M, SH3773M, SH372M, SH3775M and SH3749 are preferred.

15 With respect to the component (C), a single type thereof may be used individually or two or more types thereof may be used in combination.

[0040]

The amount of the component (C) is preferably from 0.1 to 8 % by mass, more preferably from 0.3 to 5% by mass, based on the total mass of the detergent.

20 When the amount of the component (C) is within the above-mentioned range, the detergency and the deodorizing effect are further enhanced.

[0041]

The mass ratio [(component (A) + component (B))/component (C)] (hereinafter also referred to as "(A + B)/C ratio") is 1 to 175, preferably 2.5 to 60, and
25 more preferably 4.5 to 35.

When the $(A + B)/C$ ratio is within the above range, the deodorizing effect is enhanced.

[0042]

<Component (D)>

5 The component (D) is an inorganic salt of a divalent metal.

Examples of the divalent metals include alkaline earth metals such as magnesium and calcium; transition metals such as copper, iron, nickel and manganese; zinc and the like. Examples of the salts include chloride, bromide, iodide, hydroxide, acetate, nitrate, carbonate, sulfate, phosphate and the like.

10 [0043]

Preferred examples of the component (D) include magnesium salts such as magnesium chloride, magnesium bromide, magnesium iodide, magnesium hydroxide, magnesium acetate, magnesium nitrate, magnesium carbonate, magnesium sulfate, magnesium phosphate and the like; and zinc salts such as zinc chloride, zinc bromide,
 15 zinc iodide, zinc hydroxide, zinc acetate, zinc nitrate, zinc carbonate, zinc sulfate, zinc phosphate and the like. Among these, from the viewpoint of excellent handling due to washing performance, deodorizing performance and solubility, magnesium sulfate, magnesium chloride, and zinc sulfate are more preferable.

The component (D) may be in the form of a hydrate or in the form of an
 20 anhydride.

With respect to the component (D), a single type thereof may be used individually or two or more types thereof may be used in combination.

[0044]

The amount of the divalent metal component contained in the liquid detergent for use in kitchen is preferably from 0.03 to 1 % by mass, more preferably from 0.05 to 0.5 % by mass, based on the total mass of the detergent.

When the amount of the divalent metal component is within the above-mentioned range, the detergency and the deodorizing effect are further enhanced.

The divalent metal component is derived from the component (D). However, when the detergent contains the compound represented by the formula (1) as the component (A1) and M in the formula (1) is an alkaline earth metal cation, the divalent metal component is derived from the alkaline earth metal cation in the component (A1) as well as from the component (D). Further, when the detergent contains the compound represented by the formula (2) as the component (A2) and M in the formula (2) is an alkaline earth metal cation, the divalent metal content is derived from the alkaline earth metal cation in component (A2) as well as from the component (D).

[0045]

The mass ratio [(component (A) + component (B))/divalent metal component contained in the liquid detergent for use in kitchen] (hereinafter also referred to as "(A + B)/divalent metal component ratio") is preferably 15 to 600, more preferably 30 to 350, and still more preferably 55 to 170.

When the (A + B)/divalent metal component ratio is within the above-mentioned range, the deodorizing effect is further enhanced.

[0046]

<Solvent>

The detergent of the present invention preferably contains water (hereinafter also referred to as "component (E)") as a solvent from the viewpoint of ease of preparation, solubility of the detergent in water at use of the detergent, and the like.

As the component (E), tap water, ion exchanged water, pure water, distilled
5 water and the like can be used. Among these, ion exchanged water is particularly preferable.

[0047]

The amount of the component (E) can be appropriately set in consideration of the amounts of other components. Specifically, the amount of the component (E) is
10 preferably from 20 to 90 % by mass, more preferably from 40 to 85 % by mass, and even more preferably from 50 to 75 % by mass, based on the total mass of the detergent.

When the amount of the component (E) is not less than the above lower limit value, gelation of the detergent is suppressed and liquid stability of the detergent over
15 time improves. On the other hand, when the amount of the component (E) is not more than the above upper limit value, good blending balance between the components (A) to (D) can be easily achieved. In addition, the viscosity of the detergent is prevented from becoming too low, so that the usability improves.

When the component (D) is a hydrate, the amount of the component (E) also
20 includes the amount of water derived from the component (D).

[0048]

<Optional component>

The detergent of the present invention may contain optional components other than the above-mentioned components as necessary, as long as the effects of the
25 present invention are not impaired.

As such optional components, those generally blended in liquid detergents for use in kitchen can be used, examples of which include a nonionic surfactant, a hydrotrope agent, a pH adjuster, a bleaching component, a perfume and the like.

[0049]

5 The nonionic surfactant is not particularly limited, and any known nonionic surfactants can be used, examples of which include polyoxyalkylene addition type nonionic surfactants represented by formula $R^8-O-(R^9O)_q-H$ (R^8 is a linear or branched hydrocarbon group having 8 to 18 carbon atoms, and R^9 is a hydrocarbon group having 1 to 3 carbon atoms, preferably an alkylene group, q is an average repeating number of R^9O and is a number satisfying $1 \leq q \leq 20$, preferably $5 \leq q \leq 15$), fatty acid alkanol amides, alkyl glycosides, sorbitan fatty acid esters, and the like. Among these, polyoxyalkylene (having 2 to 3 carbon atoms) alkyl (having 8 to 18 carbon atoms) ether (average number of moles of added alkylene oxide is 5 to 15) and fatty acid alkanolamide are preferable.

15 With respect to the nonionic surfactant, a single type thereof may be used individually or two or more types thereof may be used in combination.

The amount of the nonionic surfactant is preferably from 0.1 to 10 % by mass, more preferably from 0.5 to 5 % by mass, based on the total mass of the detergent.

[0050]

20 Examples of the hydrotrope agent include monohydric alcohols having 2 to 4 carbon atoms (e.g., ethanol, n-propanol, isopropanol, n-butanol, secondary butanol, tertiary butanol, etc.), glyceryl ethers having 4 to 10 carbon atoms (e.g., glycerin, hexyl glyceryl ether, etc.), toluenesulfonic acid, toluenesulfonic acid salts, cumenesulfonic acid, cumenesulfonic acid salts, benzoic acid, benzoic acid salts and the like. Among

these, ethanol is preferable from the viewpoint of excellent effect of dissolving the components (A) to (D) in the detergent and feel at use of the detergent.

With respect to the hydrotrope agent, a single type thereof may be used individually or two or more types thereof may be used in combination.

5 The amount of the hydrotrope agent is preferably from 0.1 to 10 % by mass, more preferably from 0.3 to 5 % by mass, based on the total mass of the detergent.

[0051]

Examples of the pH adjuster include hydrochloric acid, sulfuric acid, phosphoric acid, glycolic acid, citric acid, sodium hydroxide, potassium hydroxide,
10 monoethanolamine, diethanolamine, triethanolamine and the like.

With respect to the pH adjuster, a single type thereof may be used individually or two or more types thereof may be used in combination.

[0052]

With respect to the amounts of the components (A), (B), (C) and (D)
15 contained in the detergent, the total thereof does not exceed 100 % by mass, based on the total mass of the detergent. When the detergent contains the component (E), the total amount of the components (A), (B), (C), (D) and (E) contained in the detergent does not exceed 100 % by mass, based on the total mass of the detergent.

Further, the total of the amounts of all components contained in the detergent
20 is 100 % by mass.

[0053]

<Properties>

The pH of the detergent at 25 °C is preferably 2 to 9, more preferably 3 to 8.

The pH of the detergent may be adjusted using the above-mentioned pH
25 adjuster.

The pH of the detergent (adjusted to 25 °C) is a value measured in accordance with JIS K 3362-1998 using a pH meter.

[0054]

<Production Method>

5 The method for producing the detergent of the present invention is not particularly limited. For example, the production can be performed by a method in which the components (E) and (A1) are mixed and then the remaining components are added thereto, followed by adjustment of the pH of the resulting to a predetermined value.

10 [0055]

<Effects>

 Since the detergent of the present invention as described above contains the components (A), (B), (C), and (D), and the $(A + B)/C$ ratio is regulated to fall within the specific range, the detergent exhibits excellent detergency and deodorizing effect
15 even when diluted with water.

[0056]

<Method of Using Detergent>

 When washing kitchen utensils using the detergent of the present invention, the detergent of the present invention may be used diluted with water or may be used
20 without dilution with water. Since the detergent of the present invention exhibits excellent detergency even when diluted with water, the detergent can be particularly preferably used as a liquid detergent for use in kitchen to be used while being diluted with water.

When the detergent of the present invention is used while being diluted with water, it is preferable to dissolve about 5 to 15 g of the detergent of the present invention in 1 liter of water.

When the detergent of the present invention is used without dilution, it is preferable to add about 1 to 10 g of the detergent to a washing tool such as a sponge and use it.

[0057]

The present invention in one aspect thereof provides a liquid detergent for use in kitchen, including components (A), (B), (C), and (D) as described below, wherein a mass ratio $[(\text{component (A)} + \text{component (B)}) / \text{component (C)}]$ is 1 to 175 (preferably, 1.19 to 174), and the alkylbenzene sulfonate (A1) is a compound represented by the above-mentioned general formula (1).

The present invention in another aspect thereof provides a liquid detergent for use in kitchen, including components (A), (B), (C), and (D) as described below, wherein a mass ratio $[(\text{component (A)} + \text{component (B)}) / \text{component (C)}]$ is 1 to 175 (preferably, 1.19 to 174), the alkylbenzene sulfonate (A1) is a compound represented by the above-mentioned general formula (1), and the component (A) includes a compound represented by the above-mentioned general formula (2) as an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1).

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including components (A), (B), (C), and (D) as described below, wherein a weight average molecular weight of the component (C) is 2,000 to 30,000.

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including the components (A), (B), (C), and (D) as described below, wherein a mass ratio $[(\text{component (A)} + \text{component (B)}) / \text{component (C)}]$ is 1 to 175

(preferably, 1.19 to 174), the alkylbenzene sulfonate (A1) is a compound represented by the above-mentioned general formula (1), the component (A) includes a compound represented by the above-mentioned general formula (2) as an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1), and a weight average molecular weight of the component (C) is 2,000 to 30,000.

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including components (A), (B), (C), and (D) as described below, wherein a mass ratio [(component (A) + component (B))/component (C)] is 1 to 175 (preferably, 1.19 to 174), the alkylbenzene sulfonate (A1) is a compound represented by the above-mentioned general formula (1), the component (A) includes a compound represented by the above-mentioned general formula (2) as an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1), the amphoteric surfactant as described below is at least one betaine surfactant selected from the group consisting of an alkyltrimethylammoniumacetate betaine, a fatty acid amidopropyltrimethylammoniumacetate betaine, an alkylhydroxysulfobetaine, and a fatty acid amidopropylhydroxysulfobetaine, and the semipolar surfactant as described below is at least one amine oxide surfactant selected from the group consisting of an alkyltrimethylammoniumacetate betaine, an alkanoylamidoalkyltrimethylammoniumacetate betaine, an alkylhydroxysulfobetaine, and a fatty acid amidopropylhydroxysulfobetaine.

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including components (A), (B), (C), and (D) as described below, wherein a mass ratio [(component (A) + component (B))/component (C)] is 1 to 175 (preferably, 1.19 to 174), the alkylbenzene sulfonate (A1) is a compound represented by the above-mentioned general formula (1), the component (A) includes a compound represented by the above-mentioned general formula (2) as an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1), the amphoteric surfactant as described

below is at least one betaine surfactant selected from the group consisting of an alkyldimethylaminoacetic acid betaine, a fatty acid amidopropyldimethylaminoacetic acid betaine, an alkylhydroxysulfobetaine, and a fatty acid amidopropylhydroxysulfobetaine, the semipolar surfactant as described below is at least one amine oxide surfactant selected from the group consisting of an alkyldimethylamine oxide and alkanoylamidoalkyldimethylamine oxide, and a weight average molecular weight of the component (C) is 2,000 to 30,000.

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including components (A), (B), (C), and (D) as described below, wherein a mass ratio $[(\text{component (A)} + \text{component (B)})/\text{component (C)}]$ is 1 to 175 (preferably, 1.19 to 174), the alkylbenzene sulfonate (A1) is a compound represented by the above-mentioned general formula (1), the component (A) includes a compound represented by the above-mentioned general formula (2) as an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1), and the component (D) includes at least one compound selected from the group consisting of magnesium salt and zinc salt.

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including components (A), (B), (C), and (D) as described below, wherein a mass ratio $[(\text{component (A)} + \text{component (B)})/\text{component (C)}]$ is 1 to 175 (preferably, 1.19 to 174), the alkylbenzene sulfonate (A1) is a compound represented by the above-mentioned general formula (1), the component (A) includes a compound represented by the above-mentioned general formula (2) as an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1), the amphoteric surfactant as described below is at least one betaine surfactant selected from the group consisting of an alkyldimethylaminoacetic acid betaine, a fatty acid amidopropyldimethylaminoacetic acid betaine, an alkylhydroxysulfobetaine, and a fatty acid

amidopropylhydroxysulfobetaine, the semipolar surfactant as described below is at least one amine oxide surfactant selected from the group consisting of an alkyltrimethylamine oxide and alkanoylamidoalkyltrimethylamine oxide, a weight average molecular weight of the component (C) is 2,000 to 30,000, and the component (D) includes at least one compound selected from the group consisting of magnesium salt and zinc salt.

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including components (A), (B), (C), (D) and (E) as described below, and an optional component as described below, wherein a mass ratio [(component (A) + component (B))/component (C)] is 1 to 175 (preferably, 1.19 to 174), and the alkylbenzene sulfonate (A1) is a compound represented by the above-mentioned general formula (1).

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including components (A), (B), (C), (D) and (E) as described below, and an optional component as described below, wherein a mass ratio [(component (A) + component (B))/component (C)] is 1 to 175 (preferably, 1.19 to 174), the alkylbenzene sulfonate (A1) is a compound represented by the above-mentioned general formula (1), the component (A) includes a compound represented by the above-mentioned general formula (2) as an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1), the amphoteric surfactant as described below is at least one betaine surfactant selected from the group consisting of an alkyltrimethylaminoacetic acid betaine, a fatty acid amidopropyltrimethylaminoacetic acid betaine, an alkylhydroxysulfobetaine, and a fatty acid amidopropylhydroxysulfobetaine, the semipolar surfactant as described below is at least one amine oxide surfactant selected from the group consisting of an

alkyldimethylamine oxide and alkanoylamidoalkyldimethylamine oxide, a weight average molecular weight of the component (C) is 2,000 to 30,000, and the component (D) includes at least one compound selected from the group consisting of magnesium salt and zinc salt.

5 Component (A): anionic surfactant including an alkylbenzene sulfonate (A1)
 Component (B): at least one surfactant selected from the group consisting of an amphoteric surfactant and a semipolar surfactant

 Component (C): a silicone compound having a polyether group

 Component (D): an inorganic salt of a divalent metal

10 Component (E): water

 Optional component: at least one component selected from the group consisting of a nonionic surfactant, a hydrotrope agent, a pH adjusting agent, a bleaching component and a perfume

[0058]

15 The present invention in one aspect thereof provides a liquid detergent for use in kitchen, including the components (A), (B), (C), and (D), wherein a mass ratio $[(\text{component (A)} + \text{component (B)})/\text{component (C)}]$ is 2.5 to 60 (preferably 2.5 to 57.33), the component (A) includes an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1), a mass ratio $[\text{component (A1)}/\text{component (A2)}]$ is 0.2 to 4.5 (preferably from 0.23 to 4.33), and a mass ratio $[(\text{component (A)} + \text{component (B)})/\text{divalent metal component contained in the liquid detergent for use in kitchen}]$ is 30 to 350 (preferably 33.5 to 334.7).

 The present invention in another aspect thereof provides a liquid detergent for use in kitchen, including the components (A), (B), (C), and (D), wherein a mass ratio
 25 $[(\text{component (A)} + \text{component (B)})/\text{component (C)}]$ is 2.5 to 60 (preferably 2.5 to

57.33), the component (A) includes an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1), a mass ratio [component (A1)/component (A2)] is 0.2 to 4.5 (preferably from 0.23 to 4.33), a mass ratio [(component (A) + component (B))/divalent metal component contained in the liquid detergent for use in kitchen] is 30 to 350 (preferably 33.5 to 334.7), the amount of the component (A1) is 1 to 30 % by mass (preferably 1 to 15 % by mass), the amount of the component (A2) is 1 to 30 % by mass (preferably 1 to 15 % by mass), the amount of the component (B) is 0.05 to 5 % by mass, the amount of the component (C) is 0.1 to 8 % by mass, and the amount of the divalent metal component is 0.03 to 1 % by mass, each amount being based on the total mass of the detergent for use in kitchen.

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including the components (A), (B), (C), and (D), wherein a mass ratio [(component (A) + component (B))/component (C)] is 4.5 to 35 (preferably 4.83 to 34), the component (A) includes an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1), a mass ratio [component (A1)/component (A2)] is 0.45 to 2 (preferably from 0.45 to 1.67), a mass ratio [(component (A) + component (B))/divalent metal component contained in the liquid detergent for use in kitchen] is 55 to 170 (preferably 55.8 to 167.4).

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including the components (A), (B), (C), and (D), wherein a mass ratio [(component (A) + component (B))/component (C)] is 4.5 to 35 (preferably 4.83 to 34), the component (A) includes an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1), a mass ratio [component (A1)/component (A2)] is 0.45 to 2 (preferably from 0.45 to 1.67), a mass ratio [(component (A) + component (B))/divalent metal component contained in the liquid detergent for use in kitchen] is

55 to 170 (preferably 55.8 to 167.4), the amount of the component (A1) is 3 to 13 % by mass (preferably 5 to 10 % by mass), the amount of the component (A2) is 3 to 13 % by mass (preferably 6 to 11 % by mass), the amount of the component (B) is 0.2 to 2 % by mass (preferably 0.3 to 0.5 % by mass), the amount of the component (C) is 0.3 to 5 % by mass (preferably 0.5 to 3 % by mass), and the amount of the divalent metal component is 0.05 to 0.5 % by mass (preferably 0.1 to 0.3 % by mass), each amount being based on the total mass of the detergent for use in kitchen.

The present invention in another aspect thereof provides a liquid detergent for use in kitchen, including the components (A), (B), (C), and (D), wherein a mass ratio [(component (A) + component (B))/component (C)] is 2.5 to 60 (preferably 2.5 to 57.33), a mass ratio [(component (A) + component (B))/divalent metal component contained in the liquid detergent for use in kitchen] is 30 to 350 (preferably 33.5 to 334.7), the amount of the component (A1) is 10 to 30 % by mass, the amount of the component (B) is 0.05 to 5 % by mass, the amount of the component (C) is 0.1 to 8 % by mass, and the amount of the divalent metal component is 0.03 to 1 % by mass, each amount being based on the total mass of the detergent for use in kitchen.

The present invention in still another aspect thereof provides a liquid detergent for use in kitchen, including the components (A), (B), (C), and (D), wherein a mass ratio [(component (A) + component (B))/component (C)] is 4.5 to 35 (preferably 4.83 to 34), a mass ratio [(component (A) + component (B))/divalent metal component contained in the liquid detergent for use in kitchen] is 55 to 170 (preferably 55.8 to 167.4), the amount of the component (A1) is 15 to 25 % by mass, the amount of the component (B) is 0.2 to 2 % by mass (preferably 0.3 to 0.5 % by mass), the amount of the component (C) is 0.3 to 5 % by mass (preferably 0.5 to 3 % by mass), and the amount of the divalent metal component is 0.05 to 0.5 % by mass (preferably 0.1 to

0.3 % by mass), each amount being based on the total mass of the detergent for use in kitchen.

[0059]

The present invention in still another aspect thereof provides a liquid detergent
 5 for use in kitchen, including the components (A), (B), (C), (D) and (E), and the
 optional component, wherein a mass ratio [(component (A) + component
 (B))/component (C)] is 4.5 to 35 (preferably 4.83 to 34), the alkylbenzene sulfonate
 (A1) is a compound represented by the above-mentioned general formula (1), the
 component (A) includes a compound represented by the above-mentioned general
 10 formula (2) as an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1),
 the amphoteric surfactant is at least one betaine surfactant selected from the group
 consisting of an alkyldimethylaminoacetic acid betaine, a fatty acid
 amidopropyldimethylaminoacetic acid betaine, an alkylhydroxysulfobetaine, and a
 fatty acid amidopropylhydroxysulfobetaine, the semipolar surfactant is at least one
 15 amine oxide surfactant selected from the group consisting of an alkyldimethylamine
 oxide and alkanoylamidoalkyldimethylamine oxide, a weight average molecular
 weight of the component (C) is 2,000 to 30,000, the component (D) includes at least
 one compound selected from the group consisting of magnesium salt and zinc salt, a
 mass ratio [component (A1) /component (A2)] is 0.45 to 2 (preferably 0.45 to 1.67),
 20 and a mass ratio [(component (A) + component (B))/divalent metal component
 contained in the liquid detergent for use in kitchen] is 55 to 170 (preferably 55.8 to
 167.4).

The present invention in still another aspect thereof provides a liquid detergent
 for use in kitchen, including the components (A), (B), (C), (D) and (E), and the
 25 optional component, wherein a mass ratio [(component (A) + component

(B))/component (C)] is 4.5 to 35 (preferably 4.83 to 34), the alkylbenzene sulfonate (A1) is a compound represented by the above-mentioned general formula (1), the component (A) includes a compound represented by the above-mentioned general formula (2) as an anionic surfactant (A2) other than the alkylbenzene sulfonate (A1),

5 the amphoteric surfactant is at least one betaine surfactant selected from the group consisting of an alkyldimethylaminoacetic acid betaine, a fatty acid amidopropyldimethylaminoacetic acid betaine, an alkylhydroxysulfobetaine, and a fatty acid amidopropylhydroxysulfobetaine, the semipolar surfactant is at least one amine oxide surfactant selected from the group consisting of an alkyldimethylamine

10 oxide and alkanoylamidoalkyldimethylamine oxide, a weight average molecular weight of the component (C) is 2,000 to 30,000, the component (D) includes at least one compound selected from the group consisting of magnesium salt and zinc salt, a mass ratio [component (A1) / component (A2)] is 0.45 to 2 (preferably 0.45 to 1.67), a mass ratio [(component (A) + component (B))/divalent metal component contained

15 in the liquid detergent for use in kitchen] is 55 to 170 (preferably 55.8 to 167.4), the amount of the component (A1) is 3 to 13 % by mass (preferably 5 to 10 % by mass), the amount of the component (A2) is 3 to 13 % by mass (preferably 6 to 11 % by mass), the amount of the component (B) is 0.2 to 2 % by mass (preferably 0.3 to 0.5 % by mass), the amount of the component (C) is 0.3 to 5 % by mass (preferably 0.5 to 3 %

20 by mass), and the amount of the divalent metal component is 0.05 to 0.5 % by mass (preferably 0.1 to 0.3 % by mass), each amount being based on the total mass of the detergent for use in kitchen.

Examples

25 [0060]

Hereinbelow, the present invention will be described with reference to Examples which, however, should not be construed as limiting the present invention.

The amounts of the components used in the Examples are shown in terms of amounts of pure forms thereof unless otherwise specified.

5 [0061]

[Raw Materials Used]

As the component (A), the following compounds were used.

A1-1: Sodium linear alkylbenzenesulfonate (LAS) having a linear alkyl group having 10 to 14 carbon atoms (trade name: "LIPON LS - 250", manufactured by Lion Specialty Chemicals Co., Ltd., purity: 50 % by mass).

A2-1: Sodium lauryl ether sulfate (SLS) (trade name: "Sannol LM-1130", manufactured by Lion Specialty Chemicals Co., Ltd., purity: 33 % by mass).

A2-2: Sodium polyoxyethylene (2) linear alkyl (C12/C14 = 75/25; derived from natural fats and oils) ether sulfate (AES) (trade name: "SINOLIN SPE-1250", manufactured by New Japan Chemical Co., Ltd., purity: 70 % by mass).

A2-3: Methyl ester of linear alkyl fatty acid having 16 to 18 carbon atoms (α -sulfo fatty acid alkyl ester salt, MES) (trade name: "MIZULAN FL-80", manufactured by Lion Eco Chemicals Sdn.Bhd., purity: 90 % by mass).

[0062]

20 As the component (B), the following compounds were used.

B1-1: Coconut oil fatty acid amidopropyldimethylaminoacetic acid betaine (trade name: "Tego Betain L 7", manufactured by Evonik, purity: 30 % by mass).

B2-1: Lauryldimethylamine oxide (trade name: "Cadenax DM 12D-W(C)", manufactured by Lion Specialty Chemicals Co., Ltd., purity: 33 % by mass).

25 [0063]

As the component (C) or a comparative component (component (C')), the following compounds were used.

C-1: Polyether-modified silicone (trade name: "SH-3771M", manufactured by Dow Corning Toray Co., Ltd., weight average molecular weight: about 2,400, in the formula

5 (4): R^7 = hydrogen atom, $j = 7$, $k = 3$, $h = 12$, $i = 0$).

C-2: Polyether-modified silicone (trade name: "SH-3772M", manufactured by Dow Corning Toray Co., Ltd., weight average molecular weight: about 5,000, in the formula

(4): R^7 = hydrogen atom, $j = 45$, $k = 3$, $h = 12$, $i = 0$).

C-3: Polyether-modified silicone (trade name: "SH-3773M", manufactured by Dow Corning Toray Co., Ltd., weight average molecular weight: about 4,000, in the formula

10 (4): R^7 = hydrogen atom, $j = 28$, $k = 3$, $h = 12$, $i = 0$).

C-4: Polyether-modified silicone (trade name: "SH-3775M", manufactured by Dow Corning Toray Co., Ltd., weight average molecular weight: about 7,000, in the formula

(4): R^7 = hydrogen atom, $j = 70$, $k = 3$, $h = 12$, $i = 0$).

15 C-5: Polyether-modified silicone (trade name: "SH-3749", manufactured by Dow Corning Toray Co., Ltd., weight average molecular weight: about 24,000, in the formula (4): R^7 = hydrogen atom, $j = 75$, $k = 7$, $h = 20$, $i = 20$).

C-6: Dimethylpolysiloxane (trade name: "SH200 Fluid 50 CS", manufactured by Dow Corning Toray Co., Ltd.).

20 [0064]

As the component (D), the following compounds were used.

D-1: $MgSO_4 \cdot 7H_2O$ (magnesium sulfate heptahydrate, manufactured by Junsei Chemical Co., Ltd.).

D-2: $ZnSO_4 \cdot 7H_2O$ (zinc sulfate heptahydrate, manufactured by Junsei Chemical Co., Ltd.).

25

[0065]

As the optional components, the following compounds were used.

EtOH: Ethanol (trade name: "Ethanol (95)", manufactured by KANTO CHEMICAL CO., INC., purity: 95 % by mass).

- 5 CDE: Coconut oil fatty acid diethanolamide (product name: "Amisole CDE-G", manufactured by Kawaken Fine Chemicals Co., Ltd.).

AE: Polyoxyethylene mono(2-propylheptyl) ether (trade name: "Lutensol XP-100", manufactured by BASF Co., Ltd.) in which ethylene oxide is added in an amount corresponding to 10 moles to a branched alcohol having 10 carbon atoms.

- 10 PH adjuster: at least one of sodium hydroxide (1 mol/liter sodium hydroxide solution (1 N), manufactured by KANTO CHEMICAL CO., INC.) and sulfuric acid (1 mol/liter sulfuric acid (2 N), manufactured by KANTO CHEMICAL CO., INC.).

[0066]

[Examples 1 to 29, Comparative Examples 1 to 7]

- 15 In the Examples and Comparative Examples, respective detergent compositions were prepared following the compounding recipe shown in Tables 1 to 6 by a production method as shown below (no indication of a certain component means that the component was not added).

- 20 The unit for the blending amount in Tables 1 to 6 is "% by mass", and the amount for each component is shown in terms of amount of pure form thereof. The detergent in each of the Examples and Comparative Examples was prepared while balancing the amounts of the components shown in Tables 1 to 6 with component (E) (ion exchanged water) so that the total amount adds up to 100% by mass.

[0067]

1,000 g of a detergent having a composition shown in each of Tables 1 to 6 was prepared by the following procedure.

The component (A) and 300 g of the component (E) were placed in a 1-liter beaker and stirred with a Three-One motor (product name: "FBL 600", manufactured by Shinto Scientific Co., Ltd.) until the component (A) was dissolved in the component (E). Subsequently, the components (B), (C), (D) and optional components were added and the resulting was stirred until the added components were completely dissolved. After adding an appropriate amount of a pH adjuster so as to adjust the pH of the resulting mixture solution to 4.5 at 25 °C, the component (E) was added so that the total amount would add up to 100% by mass, followed by stirring until the mixture became homogeneous, thereby obtaining a detergent.

The above-mentioned pH was measured with respect to the mixture solution with its temperature adjusted to 25 °C using a glass electrode pH meter (product name: "HM-30G", manufactured by DKK-TOA Corporation). Specifically, a glass electrode of the pH meter was immersed directly in the mixture solution, and the pH was measured 1 minute later. The measurement was carried out in accordance with JIS Z 8802: 1984, "pH measurement method".

The detergent obtained in each of the Examples and Comparative Examples was evaluated by the following evaluation methods. The results are shown in Tables 1 to 6.

[0068]

<Evaluation of Detergency>

0.5 g of butter (trade name: "Snow Brand Hokkaido Butter", manufactured by Megmilk Snow Brand Co., Ltd.) was uniformly applied to a polypropylene circular flat

plate dish having a diameter of 25 cm and allowed to stand at 25 °C for 1 hour or more to prepare a dirty dish.

1 liter of 25 °C tap water was added to a plastic bowl having a diameter of 20 cm and a depth of 10 cm, followed by dropwise addition of 10 g of the detergent
 5 obtained in each of the Examples and Comparative Examples to the center of the bowl. Immediately thereafter, a sponge (trade name: "Scotch Bright" manufactured by 3M Japan Ltd.) was soaked in the bowl and sufficiently agitated while visually observing until complete dissolution of the detergent was confirmed. After agitation, the sponge was taken out while weighing the sponge with an electronic balance so that the amount
 10 of solution absorbed by the sponge would become 40 g. After the sponge taken out was squeezed five times on the above dirty dish with the butter adhering thereon so as to cause foaming, the dirty dish was rubbed ten times by the sponge with foam. Then, the dirty dish was rinsed with tap water. The rinsed dish was allowed to dry with air for 1 hour. Then, the degree of dirt removal was evaluated according to the following
 15 evaluation criteria (5-grade evaluation).

◎◎: Residual butter dirt was not visually confirmed, and there was no greasy feel when the dish was rubbed with a finger.

◎: Residual butter dirt was not visually confirmed, and there was slight greasy feel when the dish was rubbed with a finger.

20 ○: Residual butter dirt was not visually confirmed, but there was some (more than slight) greasy feel when the dish was rubbed with a finger.

△: Slight residual butter dirt was visually confirmed, and there was some (more than slight) greasy feel when the dish was rubbed with a finger.

×: Marked residual butter dirt was visually confirmed, and there was substantial
 25 greasy feel when the dish was rubbed with a finger.

[0069]

<Deodorizing Effect>

0.1 g of sardine oil (commercially available reagent, manufactured by Yoneyama Chemical Industry Co., Ltd.) was uniformly applied to a polypropylene circular flat plate dish having a diameter of 25 cm and allowed to stand at 25 °C for 1 hour or more to prepare a dirty dish.

1 liter of 25 °C tap water was added to a plastic bowl having a diameter of 20 cm and a depth of 10 cm, followed by dropwise addition of 10 g of the detergent obtained in each of the Examples and Comparative Examples to the center of the bowl. Immediately thereafter, a sponge (trade name: "Scotch Bright" manufactured by 3M Japan Ltd.) was soaked in the bowl and sufficiently agitated while visually observing until complete dissolution of the detergent was confirmed. After agitation, the sponge was taken out while weighing the sponge with an electronic balance so that the amount of solution absorbed by the sponge would become 40 g. After the sponge taken out was squeezed five times on the above dirty dish with the sardine oil adhering thereon so as to cause foaming, the dirty dish was rubbed ten times by the sponge with foam. Then, the dirty dish was rinsed with tap water. The rinsed dish was allowed to dry with air for 1 hour. Then, the residual odor was evaluated by two expert panelists according to the following evaluation criteria (5-grade evaluation).

4 points: Completely no fish smell derived from sardine oil was perceived.

3 points: Almost no fish smell derived from sardine oil was perceived.

2 points: Slight fish smell derived from sardine oil was perceived.

1 point: Substantial fish smell derived from sardine oil was perceived.

0 point: Marked fish smell derived from sardine oil was perceived.

[0070]

A mean value of the points given by the two expert panelists was obtained, based on which the evaluations were made according to the following evaluation criteria.

⊙⊙: 4 points

5 ⊙: 3 to 3.5 points

○ : 2 to 2.5 points

△: 0.5 to 1.5 points

× : 0 point

[0071]

[Table 1]

			Example						
			1	2	3	4	5	6	7
Composition [% by mass]	Component (A)	A1-1	7.0	7.0	7.0	7.0	7.0	7.0	7.0
		A2-1	3.0	3.0	3.0	3.0	3.0	3.0	3.0
		A2-2	6.0	6.0	6.0	6.0	6.0	6.0	6.0
		A2-3	0	0	0	0	0	0	0
	Component (B)	B1-1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		B2-1	0	0	0	0	0	0	0
	Component (C)	C-1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		C-2	0	0	0	0	0	0	0
		C-3	0	0	0	0	0	0	0
		C-4	0	0	0	0	0	0	0
		C-5	0	0	0	0	0	0	0
	Component (D)	D-1	10.0	5.0	3.0	2.0	1.0	0.5	0.3
		D-2	0	0	0	0	0	0	0
		Metal component	0.99	0.49	0.30	0.20	0.10	0.05	0.03
	Optional Component	EtOH	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		CDE	0	0	0	0	0	0	0
		AE	0	0	0	0	0	0	0
	Component (E)	Ion exchanged water	Balance						
	Total			100	100	100	100	100	100
pH			4.5	4.5	4.5	4.5	4.5	4.5	4.5
A1+A2[% by mass]			16.0	16.0	16.0	16.0	16.0	16.0	16.0
A1/A[% by mass]			43.75	43.75	43.75	43.75	43.75	43.75	43.75
A2/A[% by mass]			56.25	56.25	56.25	56.25	56.25	56.25	56.25
A1/A2 ratio			0.78	0.78	0.78	0.78	0.78	0.78	0.78
(A+B)/C ratio			16.50	16.50	16.50	16.50	16.50	16.50	16.50
(A+B)/Divalent metal component ratio			16.7	33.5	55.8	83.7	167.4	334.7	557.9
Evaluation of detergency			◎◎	◎◎	◎◎	◎◎	◎◎	◎	○
Deodorizing effect		Mean value	2.5	3	4	4	4	3	2
		Evaluation	○	◎	◎◎	◎◎	◎◎	◎	○

[0072]

[Table 2]

			Examples						
			8	9	10	4	11	12	13
Composition [% by mass]	Component (A)	A1-1	4.0	5.3	6.2	7.0	7.2	7.3	7.4
		A2-1	1.7	2.3	2.6	3.0	3.1	3.1	3.2
		A2-2	3.5	4.5	5.3	6.0	6.2	6.3	6.3
		A2-3	0	0	0	0	0	0	0
	Component (B)	B1-1	0.3	0.4	0.4	0.5	0.5	0.5	0.5
		B2-1	0	0	0	0	0	0	0
	Component (C)	C-1	8.0	5.0	3.0	1.0	0.5	0.3	0.1
		C-2	0	0	0	0	0	0	0
		C-3	0	0	0	0	0	0	0
		C-4	0	0	0	0	0	0	0
		C-5	0	0	0	0	0	0	0
	Component (D)	D-1	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		D-2	0	0	0	0	0	0	0
		Metal component	0.20	0.20	0.20	0.20	0.20	0.20	0.20
	Optional component	EtOH	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		CDE	0	0	0	0	0	0	0
		AE	0	0	0	0	0	0	0
	Component (E)	Ion exchanged water	Balance						
	Total			100	100	100	100	100	100
pH			4.5	4.5	4.5	4.5	4.5	4.5	4.5
A1+A2[% by mass]			9.2	12.1	14.1	16.0	16.5	16.7	16.9
A1/A[% by mass]			43.48	43.80	43.97	43.75	43.64	43.71	43.79
A2/A[% by mass]			56.52	56.20	56.03	56.25	56.36	56.29	56.21
A1/A2 ratio			0.78	0.78	0.78	0.78	0.78	0.78	0.78
(A+B)/C ratio			1.19	2.50	4.83	16.50	34.00	57.33	174.00
(A+B)/Divalent metal component ratio			48.2	63.4	73.5	83.7	86.2	87.2	88.2
Evaluation of detergency			○	◎	◎◎	◎◎	◎◎	◎◎	◎
Deodorizing effect		Mean value	2	3	4	4	4	3	2.5
		Evaluation	○	◎	◎◎	◎◎	◎◎	◎	○

[0073]

[Table 3]

			Examples					
			14	15	16	17	18	19
Composition [% by mass]	Component (A)	A1-1	7.0	7.0	7.0	7.0	7.0	7.0
		A2-1	3.0	3.0	3.0	3.0	3.0	3.0
		A2-2	6.0	6.0	6.0	6.0	6.0	6.0
		A2-3	0	0	0	0	0	0
	Component (B)	B1-1	0.5	0.5	0.5	0.5	0	0.5
		B2-1	0	0	0	0	0.5	0
	Component (C)	C-1	0	0	0	0	1.0	1.0
		C-2	1.0	0	0	0	0	0
		C-3	0	1.0	0	0	0	0
		C-4	0	0	1.0	0	0	0
		C-5	0	0	0	1.0	0	0
	Component (D)	D-1	2.0	2.0	2.0	2.0	2.0	0
		D-2	0	0	0	0	0	2.0
		Metal component	0.20	0.20	0.20	0.20	0.20	0.45
	Optional component	EtOH	0.5	0.5	0.5	0.5	0.5	0.5
		CDE	0	0	0	0	0	0
		AE	0	0	0	0	0	0
	Component (E)	Ion exchanged water	Balance					
	Total		100	100	100	100	100	100
pH		4.5	4.5	4.5	4.5	4.5	4.5	
A1+A2[% by mass]		16.0	16.0	16.0	16.0	16.0	16.0	
A1/A[% by mass]		43.75	43.75	43.75	43.75	43.75	43.75	
A2/A[% by mass]		56.25	56.25	56.25	56.25	56.25	56.25	
A1/A2 ratio		0.78	0.78	0.78	0.78	0.78	0.78	
(A+B)/C ratio		16.50	16.50	16.50	16.50	16.50	16.50	
(A+B)/Divalent metal component ratio		83.7	83.7	83.7	83.7	83.7	36.3	
Evaluation of detergency		◎◎	◎◎	◎◎	◎◎	◎◎	◎◎	
Deodorizing effect		Mean value	4	4	4	4	4	4
		Evaluation	◎◎	◎◎	◎◎	◎◎	◎◎	◎◎

[0074]

[Table 4]

			Examples						
			20	21	22	4	23	24	25
Composition [% by mass]	Component (A)	A1-1	1.0	3.0	5.0	7.0	10.0	13.0	15.0
		A2-1	5.0	4.3	3.7	3.0	2.0	1.0	0.3
		A2-2	10.0	8.7	7.3	6.0	4.0	2.0	0.7
		A2-3	0	0	0	0	0	0	0
	Component (B)	B1-1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		B2-1	0	0	0	0	0	0	0
	Component (C)	C-1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		C-2	0	0	0	0	0	0	0
		C-3	0	0	0	0	0	0	0
		C-4	0	0	0	0	0	0	0
		C-5	0	0	0	0	0	0	0
	Component (D)	D-1	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		D-2	0	0	0	0	0	0	0
		Metal component	0.20	0.20	0.20	0.20	0.20	0.20	0.20
	Optional component	EtOH	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		CDE	0	0	0	0	0	0	0
		AE	0	0	0	0	0	0	0
	Component (E)	Ion exchanged water	Balance						
	Total			100	100	100	100	100	100
pH			4.5	4.5	4.5	4.5	4.5	4.5	4.5
A1+A2[% by mass]			16.0	16.0	16.0	16.0	16.0	16.0	16.0
A1/A[% by mass]			6.25	18.75	31.25	43.75	62.50	81.25	93.75
A2/A[% by mass]			93.75	81.25	68.75	56.25	37.50	18.75	6.25
A1/A2 ratio			0.07	0.23	0.45	0.78	1.67	4.33	15.00
(A+B)/C ratio			16.50	16.50	16.50	16.50	16.50	16.50	16.50
(A+B)/Divalent metal component ratio			83.7	83.7	83.7	83.7	83.7	83.7	83.7
Evaluation of detergency			○	◎	◎◎	◎◎	◎◎	◎◎	◎◎
Deodorizing effect		Mean value	2	3	4	4	4	3	2.5
		Evaluation	○	◎	◎◎	◎◎	◎◎	◎	○

[0075]

[Table 5]

			Examples			
			26	27	28	29
Composition [% by mass]	Component (A)	A1-1	7.0	7.0	7.0	16.0
		A2-1	3.0	3.0	2.3	0
		A2-2	6.0	6.0	4.7	0
		A2-3	0	0	2.0	0
	Component (B)	B1-1	0.5	0.5	0.5	0.5
		B2-1	0	0	0	0
	Component (C)	C-1	1.0	1.0	1.0	1.0
		C-2	0	0	0	0
		C-3	0	0	0	0
		C-4	0	0	0	0
		C-5	0	0	0	0
	Component (D)	D-1	2.0	2.0	2.0	2.0
		D-2	0	0	0	0
		Metal component	0.20	0.20	0.20	0.20
	Optional component	EtOH	0.5	0.5	0.5	0.5
		CDE	2.0	0	2.0	0
		AE	0	2.0	0	0
	Component (E)	Ion exchanged water	Balance			
	Total		100	100	100	100
pH			4.5	4.5	4.5	4.5
A1+A2[% by mass]			16.0	16.0	16.0	16.0
A1/A[% by mass]			43.75	43.75	43.75	100
A2/A[% by mass]			56.25	56.25	56.25	0
A1/A2 ratio			0.78	0.78	0.78	—
(A+B)/C ratio			16.50	16.50	16.50	16.50
(A+B)/Divalent metal component ratio			83.7	83.7	83.7	83.7
Evaluation of detergency			◎◎	◎◎	◎◎	◎◎
Deodorizing effect		Mean value	4	4	4	2.5
		Evaluation	◎◎	◎◎	◎◎	○

[0076]

[Table 6]

			Comparative Examples						
			1	2	3	4	5	6	7
Composition [% by mass]	Component (A)	A1-1	0	7.0	7.0	7.0	7.0	3.2	7.39
		A2-1	3.0	3.0	3.0	3.0	3.0	1.4	3.17
		A2-2	6.0	6.0	6.0	6.0	6.0	2.7	6.33
		A2-3	0	0	0	0	0	0	0
	Component (B)	B1-1	0.5	0	0.5	0.5	0.5	0.2	0.5
		B2-1	0	0	0	0	0	0	0
	Component (C)	C-1	1.0	1.0	0	1.0	0	10.0	0.09
		C-2	0	0	0	0	0	0	0
		C-3	0	0	0	0	0	0	0
		C-4	0	0	0	0	0	0	0
		C-5	0	0	0	0	0	0	0
	Component (C')	C-6	0	0	0	0	1.0	0	0
	Component (D)	D-1	2.0	2.0	2.0	0	2.0	2.0	2.0
		D-2	0	0	0	0	0	0	0
		Metal component	0.20	0.20	0.20	0	0.20	0.20	0.20
	Optional component	EtOH	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		CDE	0	0	0	0	0	0	0
		AE	0	0	0	0	0	0	0
	Component (E)	Ion exchanged water	Balance						
	Total			100	100	100	100	100	100
pH			4.5	4.5	4.5	4.5	4.5	4.5	4.5
A1+A2[% by mass]			9.0	16.0	16.0	16.0	16.0	7.3	16.89
A1/A[% by mass]			0	43.75	43.75	43.75	43.75	43.84	43.75
A2/A[% by mass]			100	56.25	56.25	56.25	56.25	56.16	56.25
A1/A2 ratio			0	0.78	0.78	0.78	0.78	0.78	0.78
(A+B)/C ratio or (A+B)/C' ratio			9.50	16.00	—	16.50	16.50	0.75	193.22
(A+B)/Divalent metal component ratio			48.2	81.1	83.7	—	83.7	38.0	88.3
Evaluation of detergency			×	△	⊙	△	△	△	○
Deodorizing effect		Mean value	0	1	1	0.5	0.5	1.5	1.5
		Evaluation	×	△	△	△	△	△	△

[0077]

In Tables 1 to 6, the term "Metal component" means an amount of the component (D) contained in 100 % by mass of the detergent in terms of metal content (metal concentration, % by mass).

5 The term "Balance" means a blending amount (% by mass) of the component (E) (ion exchanged water) required in order that the total amount of the detergent adds up to 100 % by mass.

 The term " $A1 + A2$ " means the sum of the amounts (% by mass) of the components (A1) and (A2) in 100 % by mass of the detergent (that is, the amount (%
10 by mass) of the component (A) in 100 % by mass of the detergent). The term " $A1/A$ " means the amount (% by mass) of the component (A1) relative to the total mass of the component (A). The term " $A2/A$ " is the amount (% by mass) of the component (A2) relative to the total mass of the component (A). The term " $A1/A2$ ratio" means a mass ratio "component (A1)/component (A2)". The term " $(A + B)/C$ ratio" means a
15 mass ratio "(component (A) + component (B))/component (C)". The term " $(A + B)/\text{Divalent metal component ratio}$ " means a mass ratio [(component (A) + component (B))/divalent metal component contained in liquid detergent for use in kitchen]. In each of Examples 1 to 29 and Comparative Examples 1 to 7, the divalent metal component contained in the liquid detergent for use in kitchen is derived from the
20 component (D).

[0078]

As is apparent from Tables 1 to 5, the detergent obtained in each of the Examples was excellent in detergency and deodorizing effect even when diluted with water.

In particular, superior deodorizing effect was achieved in Examples 2 to 6 in which the $(A + B)/\text{divalent metal component}$ ratio was in the range of 30 to 350, as compared to Examples 1 and 7.

Superior detergency and deodorizing effect were achieved in Examples 4 and 5 9 to 12 in which the $(A + B)/C$ ratio was in the range of 2.5 to 60, as compared to Examples 8 and 13.

In Examples 4 and 21 to 24 in which the $A1/A2$ ratio was in the range of 0.2 to 4.5, the deodorizing effect was superior to those in Examples 20 and 25.

[0079]

10 On the other hand, Table 6 clearly shows that the detergents of Comparative Examples 1 to 4 missing some of the components (A1), (B), (C) and (D) were inferior in deodorizing effect. In particular, the detergents of Comparative Examples 1, 2, and 4 missing some of the components (A1), (B), and (D) were also inferior in detergency.

15 The detergent of Comparative Example 5 using unmodified dimethyl polysiloxane was inferior in both detergency and deodorizing effect.

The detergent of Comparative Example 6 with the $(A + B)/C$ ratio of 0.75 was inferior in both detergency and deodorizing effect.

The detergent of Comparative Example 7 with the $(A + B)/C$ ratio of 193.22 was inferior in deodorizing effect.

20

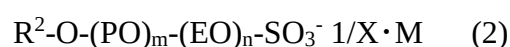
Industrial Applicability

[0080]

The liquid detergent for use in kitchen according to the present invention exhibits excellent detergency and deodorizing effect even when diluted with water.

CLAIMS

1. A liquid detergent for use in kitchen, comprising:
 component (A): anionic surfactant comprising an alkylbenzene sulfonate
 5 (A1),
 component (B): at least one surfactant selected from the group consisting of
 an amphoteric surfactant and a semipolar surfactant,
 component (C): a silicone compound having a polyether group, and
 component (D): an inorganic salt of a divalent metal,
 10 wherein a mass ratio [(component (A) + component (B))/component (C)] is 1
 to 175.
2. The liquid detergent for use in kitchen according to claim 1, wherein the
 component (A) comprises an anionic surfactant (A2) other than the alkylbenzene
 15 sulfonate (A1).
3. The liquid detergent for use in kitchen according to claim 2, wherein a mass
 ratio [component (A1)/component (A2)] is 0.05 to 15.
- 20 4. The liquid detergent for use in kitchen according to claim 2 or 3, wherein the
 component (A2) comprises a compound represented by the following general formula
 (2):



wherein R^2 is a linear or branched alkyl group having 8 to 18 carbon atoms, m is an average repeating number of PO and is a number satisfying $0 \leq m < 1$, n is an average repeating number of EO and is a number satisfying $0 \leq n \leq 4$, PO represents a propyleneoxy group, EO represents an ethyleneoxy group, M is a counter ion, and X is
5 a valence of M.

5. The liquid detergent for use in kitchen according to any one of claims 1 to 4, wherein a mass ratio [(component (A) + component (B))/divalent metal component contained in the liquid detergent for use in kitchen] is 15 to 600.