

Description

FRAMED SOAP COMPOSITION

[Field of the Invention]

[0001]

The present invention relates to a framed soap composition.

[Background of the Invention]

[0002]

Solid soap comprises fatty acid soap as the main ingredient. For example, there are known a framed soap composition which comprises a fatty acid, a nonionic surfactant, and an inorganic salt (Patent Publication 1) and cosmetic solid soap which comprises a higher fatty acid soap component and an ether carboxylic acid (Patent Publication 2) or the like.

However, soap is known to react with, for example, magnesium ions and calcium ions in hard water and generate water-insoluble scum.

[Citation List]

[Patent Publication]

[0003]

[Patent Publication 1] JP-A-H10-168494

[Patent Publication 2] JP-A-H08-113529

[Summary of the Invention]

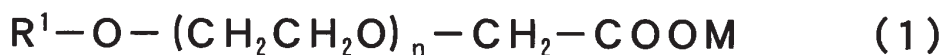
[0004]

The present invention relates to a framed soap composition, comprising the following components (A), (B), (C), and (D):

(A) from 10 to 50% by mass of a fatty acid having 8 to 22 carbon atoms or a sodium salt thereof,

(B) from 1 to 25% by mass of an alkyl ether carboxylic acid or a salt thereof represented by the formula (1):

[0005]



[0006]

wherein, R^1 represents an alkyl group having 4 to 22 carbon atoms, n represents a number of from 0 to 20, and M represents a hydrogen atom, alkali metal, alkaline earth metal, ammonium, or organic ammonium,

wherein, R^1 has an average carbon number of from 10.8 to 12.8,

and wherein, the alkyl ether carboxylic acid or the salt thereof contains a component in which $n = 0$ in an amount of more than 9.6% by mass and 27% by mass or less, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 21% by mass or more and less than 40% by mass,

(C) from 0.1 to 10% by mass of a salt other than the components (A) and (B), and
(D) water,
wherein the mass ratio of the content of the components (A) and (B) in terms of acids, $(B) / ((A) + (B))$, is from 0.04 to 0.6.

[Detailed Description of the Invention]

[0007]

The soap composition of Patent Publication 1 makes soap difficult to be crack and wrinkly, but may get a bathroom or the like dirty due to a poor dispersibility of scum. Also, the solid soap of Patent Publication 2 took time to solidify and had problems in production.

Furthermore, fatty acid soap had a problem of poor lathering performance at low temperature.

[0008]

The present invention relates to a framed soap composition which has excellent scum dispersibility, suppresses getting a bathroom or the like dirty, and has good lathering performance at low temperature.

[0009]

The present inventor found that a framed soap composition which has excellent scum dispersibility, suppresses getting a bathroom or the like dirty, and has good lathering performance at low temperature can be obtained by combining a fatty acid or a sodium salt

thereof, an alkyl ether carboxylic acid having a specific distribution or a salt thereof, salts other than the aforesaid ones, and water in a specific ratio.

[0010]

The framed soap composition of the present invention has excellent scum dispersibility, suppresses getting a bathroom or the like dirty, and has good lathering performance at low temperature.

[0011]

A fatty acid as the component (A) used in the present invention preferably has 8 to 22 carbon atoms and further preferably 12 to 18 carbon atoms. As the fatty acid of the component (A), fatty acids obtained from animal oil or fat such as beef tallow and lard; and from vegetable oil or fat such as palm oil, palm kernel oil, coconut oil, castor oil, soybean oil, cottonseed oil, rapeseed oil, and sunflower oil can be used alone or in combination of two or more thereof.

[0012]

The fatty acid or a sodium salt thereof of the component (A) can be used alone or in combination of two or more thereof, and from the viewpoint of excellent formability of soap and flowability during production, the content thereof in terms of an acid is 10% by mass or more, preferably 15% by mass or more, more preferably 20% by mass or more, 50% by mass or less, preferably 45% by mass or less, and more preferably 41% by mass or less of

the total composition. Also, the content of the component (A) in terms of an acid is from 10 to 50% by mass, preferably from 15 to 45% by mass, and more preferably from 20 to 41% by mass of the total composition.

[0013]

The alkyl ether carboxylic acid or the salt thereof of the component (B) used in the present invention is represented by the formula (1).

In the formula, R^1 is an alkyl group having 4 to 22 carbon atoms, preferably an alkyl group having 6 to 20 carbon atoms, more preferably an alkyl group having 8 to 18 carbon atoms, even more preferably an alkyl group having 8 to 16 carbon atoms, further preferably an alkyl group having 10 to 16 carbon atoms. Also, although the alkyl chain of R^1 may be either linear or branched, from the viewpoint of foaming properties, a linear alkyl group is preferred. Also, R^1 has an average carbon number of from 10.8 to 12.8, preferably from 10.8 to 12.5, and more preferably from 12.1 to 12.4. It is preferable that the average carbon number be within the above range since excellent foaming properties and foam qualities are obtained.

Also, R^1 preferably contains two or more alkyl groups, and the content of a component having the alkyl chain length contained therein with the highest content is preferably 55% by mass or more and less than 97% by

mass, more preferably from 60 to 95% by mass, and even more preferably from 70 to 95% by mass since excellent volume of foam and foam qualities are obtained.

[0014]

Further, in the formula, n represents a number of from 0 to 20, preferably from 0 to 12. Also, n represents the number of moles of ethylene oxide added, and an average number of moles added (an average value of n) in the composition of the component (B) is preferably from 1.5 to 10, more preferably from 2.5 to 6.4, even more preferably from 2.5 to 4.0, even more preferably from 2.5 to 3.7, even more preferably from 2.5 to 3.4, even more preferably from 2.8 to 3.4, and further preferably from 2.8 to 3.1 since favorable lathering performance is achieved.

The alkyl ether carboxylic acid or the salt thereof of the component (B) contains, in the formula (1), a component in which $n = 0$ in an amount of more than 9.6% by mass and 27% by mass or less, preferably from 9.8 to 27% by mass, more preferably from 9.9 to 27% by mass, even more preferably from 9.9 to 16% by mass, and further preferably from 9.9 to 15% by mass. When the content of the component in which $n = 0$ is within the above range, excellent volume of foam and foam qualities are achieved.

Further, preferably, the component (B) contains a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 21% by mass or more and less than

40% by mass, preferably from 27 to 37% by mass, more preferably from 27 to 36.5% by mass, and even more preferably from 35 to 36.1% by mass from the viewpoint of foam qualities and the volume of foam.

[0015]

Also, in the formula, examples of M include a hydrogen atom; alkali metal such as sodium and potassium; alkaline earth metal such as calcium and magnesium; ammonium; alkanolamine-derived ammonium such as monoethanolamine, diethanolamine, and triethanolamine. Among them, from the viewpoint of foaming properties and absence of coloration over time, a hydrogen atom, alkali metal, and ammonium are preferred, and a hydrogen atom, sodium, potassium, and ammonium are more preferred.

[0016]

In the formula (1), in the component having the alkyl chain length of the highest content in the composition of R^1 , the alkyl ether carboxylic acid or the salt thereof of the component (B) preferably has a mass ratio of the components in which $n = 0, 1, 2, 3$, and 4 , (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$), of $1 : 0.99$ to $3.50 : 0.89$ to $3.00 : 0.76$ to $3.00 : 0.63$ to 1.52 from the viewpoint that foaming properties, detergency, and a

feeling of freshness after rinsing can be achieved simultaneously.

[0017]

Also, in the formula (1), it is preferable that the content of a component in which $n = 0$ be 9.9% by mass or more and less than 12% by mass and a ratio of (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.53 to 1.87 : 1.59 to 2.25 : 1.33 to 2.16 : 1.14 to 1.52 in the component having the alkyl chain length of the highest content in the composition of R^1 , or it is preferable that the content of a component in which $n = 0$ be from 12 to 17% by mass and a ratio of (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 0.99 to 1.34 : 0.89 to 1.40 : 0.76 to 1.23 : 0.63 to 1 in the component having the alkyl chain length of the highest content in the composition of R^1 , from the viewpoint of foam qualities and volume of foam.

[0018]

Further, in the formula (1), it is preferable that the content of a component in which $n = 0$ be from 9.9 to 11.5% by mass and has a ratio of (the mass of a component in which $n = 0$) : (the mass of a component in which $n =$

1) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.58 to 1.84 : 1.72 to 2.17 : 1.49 to 2.00 : 1.14 to 1.52 in the component having the alkyl chain length of the highest content in the composition of R^1 , or it is preferable that the content of a component in which $n = 0$ be from 13 to 15% by mass and a ratio of (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.00 to 1.31 : 0.93 to 1.34 : 0.79 to 1.18 : 0.63 to 1 in the component having the alkyl chain length of the highest content in the composition of R^1 , from the viewpoint of foam qualities and volume of foam.

[0019]

Preferably, in the component (B), in the formula (1), R^1 is an alkyl group having 4 to 22 carbon atoms and has an average carbon number of from 10.8 to 12.8; the content of a component having an alkyl chain length which is contained in the highest content is 55% by mass or more and less than 97% by mass; n represents a number of from 0 to 20 and an average value of the number of moles added, as indicated by n , is from 1.5 to 10, further, from 2.5 to 6.4; and the component (B) contains a component in which $n = 0$ in an amount of from 9.8 to 27% by mass, and a component in which $n = 1$ and a component

in which $n = 2$ in a total amount of from 27 to 37% by mass. Also, in the formula, M is preferably a hydrogen atom, sodium, potassium, or ammonium. A framed soap composition which comprises the alkyl ether carboxylic acid or the salt thereof having the aforementioned configuration can achieve accelerated foaming properties.

[0020]

It is preferable that, in the component (B), in the formula (1), R^1 be an alkyl group having 6 to 20 carbon atoms, R^1 has an average carbon number of from 10.8 to 12.8, and the content of a component having an alkyl chain length contained therein with the highest content be 55% by mass or more and less than 97% by mass, and further, n represents a number of from 0 to 20 and the average value of n be from 2.5 to 3.7, and a component in which $n = 0$ be contained in an amount of from 9.8 to 27% by mass, and a component in which $n = 1$ and a component in which $n = 2$ be contained in a total amount of from 27 to 37% by mass. Also, as M in the formula, a hydrogen atom, sodium, potassium, and ammonium are preferred. A framed soap composition which comprises the alkyl ether carboxylic acid or the salt thereof having the aforementioned configuration can achieve accelerated foaming properties.

[0021]

It is preferable that, in the component (B), in the formula (1), R^1 be an alkyl group having 8 to 18 carbon

atoms, R^1 has an average carbon number of 10.8 to 12.8, and the content of a component having the alkyl chain length contained therein with the highest content be 55% by mass or more and less than 97% by mass, and further, n represents a number of from 0 to 20 and the average value of n be from 2.5 to 3.4, and a component in which $n = 0$ be contained in an amount of from 9.9 to 27% by mass, and a component in which $n = 1$ and a component in which $n = 2$ be contained in a total amount of from 27 to 36.5% by mass. Also, as M in the formula, a hydrogen atom, sodium, potassium, and ammonium are preferred. A framed soap composition which comprises the alkyl ether carboxylic acid or the salt thereof having the aforementioned configuration can have improved foam qualities and volume of foam.

[0022]

It is preferable that, in the component (B), in the formula (1), R^1 be an alkyl group having 8 to 16 carbon atoms, R^1 has an average carbon number of 10.8 to 12.5, and the content of a component having the alkyl chain length contained therein with the highest content be from 60 to 95% by mass, and further, n represents a number of from 0 to 20 and the average value of n be from 2.8 to 3.4, and a component in which $n = 0$ be contained in an amount of from 9.9 to 16% by mass, and a component in which $n = 1$ and a component in which $n = 2$ be contained in a total amount of from 27 to 36.5% by mass. Also, as

M in the formula, a hydrogen atom, sodium, potassium, and ammonium are preferred. A framed soap composition which comprises the alkyl ether carboxylic acid or the salt thereof having the aforementioned configuration can have improved volume of foam and foam qualities.

[0023]

It is preferable that, in the component (B), in the formula (1), R^1 be an alkyl group having 10 to 16 carbon atoms, R^1 has an average carbon number of from 12.1 to 12.4, and the content of a component having the alkyl chain length which is contained in the highest content be from 70 to 95% by mass, and further, n represents a number of from 0 to 20 and the average value of n be from 2.8 to 3.1, and a component in which $n = 0$ be contained in an amount of from 9.9 to 15% by mass, and a component in which $n = 1$ and a component in which $n = 2$ be contained in a total amount of from 35 to 36.1% by mass. Also, as M in the formula, a hydrogen atom, sodium, potassium, and ammonium are preferred. A framed soap composition which comprises the alkyl ether carboxylic acid or the salt thereof having the aforementioned configuration can have improved volume of foam and foam qualities.

[0024]

It is to be noted that in the component (B) of the present invention, the distribution of the alkyl chain length of R^1 , the average alkyl chain length of R^1 , the

amount of a component in which $n = 0$, the average number of added moles n , and a mass ratio of the components in which $n = 0, 1, 2, 3$, and 4 are obtained as follows from the gas chromatographic analysis of the alkyl ether carboxylic acid represented by the formula (1).

[0025]

[Distribution of the alkyl chain length of R^1]

From the peak areas obtained by gas chromatography, a peak area of each alkyl chain length corresponding to $n = 0$ mole was obtained, and setting the sum of the peak areas thus obtained at 100, the percentage of the distribution of each alkyl chain length was calculated. Similar calculation was carried out also as to $n = 1$ to 3 moles, and the percentage values of the distribution of each alkyl chain length corresponding to $n = 0$ to 3 moles were averaged out, whereby the distribution of the alkyl chain length of R^1 was obtained (from this, the alkyl group component contained in the highest amount in the composition of R^1 can be specified).

[0026]

[Average alkyl chain length of R^1]

From the distribution of the alkyl chain length of R^1 obtained as above, the proportion of each component was obtained, which was multiplied by the number of carbon atoms of the corresponding alkyl chain length, and the resulting values were summed up. The value thus obtained was used as an average alkyl chain length.

[0027]

[Amount of a component in which $n = 0$, total amount of a component in which $n = 1$ and a component in which $n = 2$]

In the composition of R^1 , the alkyl chain length contained therein with the highest content was specified, and the peak areas of the component having alkyl chain length of the highest content corresponding to $n = 0$ to 10 were added up by gas chromatography. By setting the total amount thus obtained at 100%, the amount of a component in which $n = 0$, the total amount of a component in which $n = 1$ and a component in which $n = 2$ were calculated.

[0028]

[Average number of added moles n]

In the composition of R^1 , the alkyl chain length of the highest content was specified, and the peak areas of the component having the alkyl chain length of the highest content corresponding to $n = 0$ to 10 were added up by gas chromatography (the amount of a component in which n is 11 or more was so small that it was excluded from the calculation). By setting the total amount thus obtained at 1, each proportion of $n = 0$ to 10 was obtained. The resulting proportion was multiplied by each number of added moles, and the sum of the resulting values was used as the average number of added moles n .

[0029]

[Mass ratio of the components in which $n = 0, 1, 2, 3,$
and 4]

As to the mass ratio of each of the components having different numbers of moles of EO added, the distribution of the alkyl chain length of R^1 was obtained from the peak area obtained by gas chromatography by the method described above, and the component having the alkyl chain length of the highest content in the composition of R^1 was specified, and the ratio of each of the components having different numbers of moles of EO added was specified by the area ratio of $n = 0, n = 1, n = 2, n = 3,$ and $n = 4$ of the component having the alkyl chain length of the highest content.

[0030]

The alkyl ether carboxylic acid or the salt thereof of the component (B) has the aforementioned composition, and from the viewpoint of gentleness to skin, foam qualities, and difficulty in swelling up, the content thereof in terms of an acid is 1% by mass or more, preferably 3% by mass or more, more preferably 5% by mass or more, 25% by mass or less, preferably 20% by mass or less, and more preferably 15% by mass or less of the total composition. Also, the content of the component (B) in terms of an acid is from 1 to 25% by mass, preferably from 3 to 20% by mass, and more preferably from 5 to 15% by mass of the total composition.

[0031]

Also, the mass ratio of the content of the components (A) and (B) in terms of acids $(B) / ((A) + (B))$ is, from the viewpoint of suppressing dirt in the bathroom, 0.04 or more, preferably 0.05 or more, more preferably 0.06 or more, 0.6 or less, preferably 0.55 or less, and more preferably 0.5 or less. Also, the mass ratio of the content of the components (A) and (B) in terms of acids $(B) / ((A) + (B))$ is from 0.04 to 0.6, preferably from 0.05 to 0.55, and more preferably from 0.06 to 0.5.

[0032]

The salt of the component (C) used in the present invention is a salt other than the components (A) and (B), and may be either an inorganic salt or an organic acid salt.

Examples of the inorganic salt include salts of halogen, sulfuric acid, sulfurous acid, and phosphoric acid or the like with alkali metal, alkaline earth metal, and aluminum or the like. Salts selected from, for example, sodium chloride, potassium chloride, sodium sulfate, potassium sulfate, magnesium chloride, magnesium sulfate, aluminum chloride, and aluminum sulfate can be used alone or in combination of two or more thereof. Among them, from the viewpoint of accelerating solidification and enhancing hardness of soap, sodium chloride, sodium sulfate, and potassium chloride are preferred.

[0033]

Also, examples of the organic acid salts include salts of acids containing a sulfate group having 8 to 22 carbon atoms and acids containing a carboxylic acid having 6 or less carbon atoms with alkali metal, alkaline earth metal, aluminum, and the like. For example, in addition to sodium lauryl sulfate, salts of one or more acids selected from acetic acid, lactic acid, malic acid, citric acid, and succinic acid can be used in combination. Among them, from the viewpoint of enhancing stabilization of the aroma, aluminum lactate, sodium lactate, and sodium lauryl sulfate are preferred.

[0034]

The component (C) can be used alone or in combination of two or more thereof, and from the viewpoint of being able to solidify the soap fast and to easily remove the soap from the frame, the content thereof is 0.1% by mass or more, preferably 0.5% by mass or more, 10% by mass or less, preferably 6% by mass or less, and more preferably 5% by mass or less of the total composition. The content of the component (C) is from 0.1 to 10% by mass, preferably from 0.1 to 6% by mass, and more preferably from 0.5 to 5% by mass of the total composition.

[0035]

Water of the component (D) used in the present invention is used as a solvent, and the content thereof

is preferably 10% by mass or more, more preferably 15% by mass or more, preferably 85% by mass or less, and more preferably 65% by mass or less of the total composition. Also, the content of water of the component (D) is preferably from 10 to 85% by mass and more preferably from 15 to 65% by mass of the total composition.

[0036]

The framed soap composition of the present invention can further comprise (E) a polyol to thereby increase the hardness of the soap as well as to provide a glossy appearance.

Examples of the polyol include divalent alcohols such as 1,3-butylene glycol, propylene glycol, isoprene glycol, tri- or more valent alcohols such as glycerin, sorbitol, xylitol, mannitol, and glucose, water-soluble polysaccharides such as sucrose and trehalose, polyethylene glycol, polypropylene glycol or the like.

Among them, 1,3-butylene glycol, glycerin, sorbitol, and polyethylene glycol and polypropylene glycol having a molecular weight of 8000 or less are preferred, and 1,3-butylene glycol, glycerin, and sorbitol are further preferred.

[0037]

The polyol of the component (E) can be used alone or in combination of two or more thereof, and from the viewpoint of increasing a moist feeling on washed skin, the content thereof is preferably 1% by mass or more,

more preferably 3% by mass or more, even more preferably 5% by mass or more, preferably 40% by mass or less, more preferably 35% by mass or less, and even more preferably 25% by mass or less of the total composition. Also, the content of the component (E) is preferably from 1 to 40% by mass, more preferably from 3 to 35% by mass, and even more preferably from 5 to 25% by mass of the total composition.

[0038]

The framed soap composition of the present invention can further comprise (F) a nonionic surfactant. This enhances the washing performances as well as makes the soap easier to produce without causing thickening on mixing at high temperature during production.

The nonionic surfactant is preferably a compound which has a polyoxyethylene group having the average number of moles of EO added of from 6 to 150, and preferably, from 10 to 50 as the hydrophilic group and an alkyl group having 10 to 18 carbon atoms, and preferably, 12 to 14 carbon atoms as the hydrophobic group.

[0039]

Also, the compounds preferably have an HLB of 8 or more, and more preferably an HLB of 10 or more.

Here, an HLB (Hydrophilic-Lipophilic Balance) indicates the molecular weight of the hydrophilic group portion based on the total molecular weight of a surfactant. The HLB of a polyoxyethylene nonionic

surfactant can be obtained by using the Griffin's equation shown below.

[0040]

HLB value = $E / 5$

E: % by weight of the polyoxyethylene portion contained in a surfactant molecule

[0041]

Examples of the nonionic surfactant include polyethylene glycol fatty acid esters such as polyethylene glycol (12) monolaurate (HLB 13.7); polyoxyethylene alkyl ethers such as polyoxyethylene (23) lauryl ether (HLB 16.9), polyoxyethylene (30) lauryl ether (HLB 18); and polyoxyethylene sorbitan fatty acid esters such as polyoxyethylene (20) sorbitan monolaurate (HLB 16.7) or the like. Among them, polyethylene glycol (12) monolaurate (HLB 13.7) and polyoxyethylene (20) sorbitan monolaurate (HLB 16.7) are preferred.

[0042]

The nonionic surfactant of the component (F) can be used alone or in combination of two or more thereof, and from the viewpoint of enhancing lathering performance at low temperature, the content thereof is preferably 0.1% by mass or more, more preferably 0.5% by mass or more, even more preferably 1% by mass or more, further more preferably 5% by mass or more, preferably 25% by mass or less, more preferably 20% by mass or less, and even more preferably 15% by mass or less of the total composition.

Also, the content of the component (F) is preferably from 0.1 to 25% by mass, more preferably from 0.5 to 20% by mass, even more preferably from 1 to 15% by mass, and further preferably from 5 to 15% by mass of the total composition.

[0043]

Also, in the case where molten soap is whipped and subjected to aeration treatment, in order to prevent the liquid phase from separating due to defoaming of the molten soap poured into a frame, hydroxy acid ester surfactants, monoglyceride surfactants, sucrose ester surfactants, and lactic acid ester surfactants can be further added to the framed soap composition of the present invention. Among them, lactic acid ester surfactants are preferably added. The content of these ester surfactants is preferably from 0.1 to 10% by mass and more preferably from 0.5 to 5% by mass of the total composition.

[0044]

Furthermore, from the viewpoint of the volume of foam, the framed soap composition of the present invention can comprise an anionic surfactant other than the component (A) and the component (B). Specifically, examples of the anionic surfactant include alkanoyl isethionates, methyl taurate, sarcosinates, sulfosuccinates, monoalkylphosphates, and alkanoyl- β -

alanine salts or the like, and more preferably include alkanoyl isethionates.

The anionic surfactants other than the component (A) and the component (B) can be used alone or in combination of two or more thereof, and the content thereof is preferably from 1 to 20% by mass and more preferably from 2 to 15% by mass of the total composition.

[0045]

From the viewpoint of foaming properties, the framed soap composition of the present invention can further comprise an amphoteric surfactant. Specifically, examples of the amphoteric surfactant include betaine surfactants, amino acid surfactants, imidazoline surfactants, amine oxide surfactants, or the like. The examples preferably include betaine surfactants, and further preferably include alkylamide propyl betaines and sulfobetaine.

The amphoteric surfactant can be used alone or in combination of two or more thereof, and to improve the foam durability, the content thereof is preferably from 0.1 to 20% by mass, more preferably from 1 to 15% by mass, and even more preferably from 0.1 to 10% by mass, and further preferably from 1 to 5% by mass of the total composition.

[0046]

The framed soap composition of the present invention can comprise an antibacterial agent, and examples of the

antibacterial agent preferably include triclosan and trichlorocarbanilide. The content thereof is preferably from 0.01 to 2% by mass of the total composition. Also, the composition can comprise fragrances, pigments or dyes and the like, and the content thereof is preferably 0.02 to 5% by mass of the total composition. The composition can further comprise an oil agent, and examples of the oil agent preferably include lanolin, paraffins, petrolatum, and isopropyl myristate. In order to increase the moist feeling, the content thereof is preferably from 0.05 to 20% by mass and more preferably from 0.05 to 5% by mass of the total composition. The composition can further comprise a chelator, and examples of the chelator preferably include etidronic acid and ethylenediaminetetraacetic acid. The content thereof is preferably from 0.01 to 2% by mass of the total composition.

The composition can further comprise an antioxidant, and examples of the antioxidant preferably include dibutylhydroxytoluene. The content thereof is preferably from 0.01 to 1% by mass of the total composition.

[0047]

The framed soap composition of the present invention can be produced by a routine method. For example, components (A) to (D) (further components (E) and (F) as needed) are heated and dissolved, and neutralized with addition of an alkali agent while stirring. A

homogeneous mixture solution of a fragrance and other water-soluble components is added thereto, and is further stirred to homogeneity. It is possible to produce the framed soap composition by placing the obtained molten soap in a frame, cooling the soap to be solidified, and drying the soap as needed.

[0048]

Also, in the case of producing light-weight (floating) soap by making the soap contain air bubbles, it is possible to produce the soap by subjecting the obtained molten soap to aeration treatment using a domestic or industrial whipping device to thereby make the soap contain air bubbles, placing the obtained molten soap containing air bubbles in a frame, cooling the soap to be solidified, and drying the soap as needed.

In the case of making the soap contain air bubbles, the volume fraction of the air bubbles contained is preferably at least 5% or more, further 15% or more, and 95% or less.

In connection with the aforementioned embodiments, the present invention further discloses the following compositions, production method, or applications.

[0049]

<1> A framed soap composition comprising the following components (A), (B), (C) and (D):

(A) from 10 to 50% by mass of a fatty acid having 8 to 22 carbon atoms or a sodium salt thereof,

(B) from 1 to 25% by mass of an alkyl ether carboxylic acid or a salt thereof represented by the formula (1)

[0050]



[0051]

wherein R^1 represents an alkyl group having 4 to 22 carbon atoms, n represents a number of from 0 to 20, and M represents a hydrogen atom, alkali metal, alkaline earth metal, ammonium, or organic ammonium,

wherein R^1 has an average carbon number of from 10.8 to 12.8, and

wherein the alkyl ether carboxylic acid or the salt thereof contains a component in which $n = 0$ in an amount of more than 9.6% by mass and 27% by mass or less, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 21% by mass or more and less than 40% by mass,

(C) from 0.1 to 10% by mass of a salt other than the components (A) and (B), and

(D) water, and

wherein the mass ratio of the content of the components (A) and (B) in terms of acids, $(B) / ((A) + (B))$, is from 0.04 to 0.6.

[0052]

<2> The framed soap composition according to the aforementioned <1>, wherein the fatty acid of the component (A) has preferably 12 to 18 carbon atoms.

<3> The framed soap composition according to the aforementioned <1> or <2>, wherein, as the fatty acid of the component (A), a fatty acid obtained from beef tallow, lard, palm oil, palm kernel oil, coconut oil, castor oil, soybean oil, cottonseed oil, rapeseed oil, and sunflower oil is used alone or in combination of two or more thereof.

<4> The framed soap composition according to any one of the aforementioned <1> to <3>, wherein the content of the fatty acid or a sodium salt thereof of the component (A) in terms of an acid is preferably from 15 to 45% by mass and more preferably from 20 to 41% by mass of the total composition.

[0053]

<5> The framed soap composition according to any one of the aforementioned <1> to <4>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), R^1 is preferably an alkyl group having 6 to 20 carbon atoms, more preferably an alkyl group having 8 to 18 carbon atoms, even more preferably an alkyl group having 8 to 16 carbon atoms, and further preferably an alkyl group having 10 to 16 carbon atoms.

<6> The framed soap composition according to any one of the aforementioned <1> to <5>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), the alkyl chain of R^1 may be a linear or branched chain, and a linear alkyl group is preferred.

<7> The framed soap composition according to any one of the aforementioned <1> to <6>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), R^1 has an average carbon number of preferably from 10.8 to 12.5 and more preferably from 12.1 to 12.4.

[0054]

<8> The framed soap composition according to any one of the aforementioned <1> or <7>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), R^1 preferably contains two or more alkyl groups and the content of a component having an alkyl chain length which is contained in the highest content is more preferably 55% by mass or more and less than 97% by mass, even more preferably from 60 to 95% by mass, and further preferably from 70 to 95% by mass.

<9> The framed soap composition according to any one of the aforementioned <1> to <8>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the

component (B), in the formula (1), n is preferably from 0 to 12.

<10> The framed soap composition according to any one of the aforementioned <1> to <9>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), an average number of moles of ethylene oxide added (an average value of n) is preferably from 1.5 to 10, more preferably from 2.5 to 6.4, even more preferably from 2.5 to 4.0, even more preferably from 2.5 to 3.7, even more preferably from 2.5 to 3.4, even more preferably from 2.8 to 3.4, and further preferably from 2.8 to 3.1.

[0055]

<11> The framed soap composition according to any one of the aforementioned <1> to <10>, wherein the alkyl ether carboxylic acid or the salt thereof of the component (B) preferably contains, in the formula (1), a component in which $n = 0$ in an amount of from 9.8 to 27% by mass, more preferably from 9.9 to 27% by mass, even more preferably from 9.9 to 16% by mass, and further preferably from 9.9 to 15% by mass.

<12> The framed soap composition according to any one of the aforementioned <1> to <11>, wherein the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), preferably contains a component in which $n = 1$ and a component in which $n = 2$ in a total amount of from 27 to 37% by mass, more preferably from 27

to 36.5% by mass, and even more preferably from 35 to 36.1% by mass.

<13> The framed soap composition according to any one of the aforementioned <1> to <12>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), M is preferably at least one selected from the group consisting of a hydrogen atom; alkali metal such as sodium and potassium; alkaline earth metal such as calcium and magnesium; ammonium; and ammonium derived from an alkanolamine such as monoethanolamine, diethanolamine, and triethanolamine, and is more preferably at least one selected from the group consisting of a hydrogen atom, sodium, potassium, and ammonium.

[0056]

<14> The framed soap composition according to any one of the aforementioned <1> to <13>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), in the component having the alkyl chain length of the highest content in the composition of R^1 , the mass ratio of the components in which $n = 0, 1, 2, 3$, and 4 is preferably (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 0.99 to 3.50 : 0.89 to 3.00 : 0.76 to 3.00 : 0.63 to 1.52.

<15> The framed soap composition according to any one of the aforementioned <1> to <14>, wherein, preferably, the alkyl ether carboxylic acid or the salt thereof of the component (B) contains, in the formula (1), a component in which $n = 0$ in an amount of 9.9% by mass or more and less than 12% by mass and has a ratio of (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.53 to 1.87 : 1.59 to 2.25 : 1.33 to 2.16 : 1.14 to 1.52 in the component having the alkyl chain length of the highest content in the composition of R^1 .

[0057]

<16> The framed soap composition according to any one of the aforementioned <1> to <14>, wherein, preferably, the alkyl ether carboxylic acid or the salt thereof of the component (B) contains, in the formula (1), a component in which $n = 0$ in an amount of from 12 to 17% by mass and has a ratio of (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 0.99 to 1.34 : 0.89 to 1.40 : 0.76 to 1.23 : 0.63 to 1 in the component having the alkyl chain length of the highest content in the composition of R^1 .

<17> The framed soap composition according to any one of the aforementioned <1> to <14>, wherein, preferably, the alkyl ether carboxylic acid or the salt thereof of the component (B) contains, in the formula (1), a component in which $n = 0$ in an amount of from 9.9 to 11.5% by mass, and in the component having the alkyl chain length of the highest content in the composition of R^1 , the mass ratio of the components in which $n = 0, 1, 2, 3$, and 4 is (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.58 to 1.84 : 1.72 to 2.17 : 1.49 to 2.00 : 1.14 to 1.52.

<18> The framed soap composition according to any one of the aforementioned <1> to <14>, wherein, preferably, the alkyl ether carboxylic acid or the salt thereof of the component (B) contains, in the formula (1), a component in which $n = 0$ in an amount of from 13 to 15% by mass, and in the component having the alkyl chain length of the highest content in the composition of R^1 , the mass ratio of the components in which $n = 0, 1, 2, 3$, and 4 is preferably (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.00 to 1.31 : 0.93 to 1.34 : 0.79 to 1.18 : 0.63 to 1.

[0058]

<19> The framed soap composition according to any one of the aforementioned <1> to <18>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), R^1 is preferably an alkyl group having 8 to 22 carbon atoms, R^1 preferably has an average carbon number of from 10.8 to 12.8, the content of a component having an alkyl chain length which is contained in the highest content is preferably 55% by mass or more and less than 97% by mass, and the average value of n is preferably from 1.5 to 10 and more preferably from 2.5 to 6.4, and wherein the component (B) preferably contains a component in which $n = 0$ in an amount of from 9.8 to 27% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of from 27 to 37% by mass.

<20> The framed soap composition according to any one of the aforementioned <1> to <19>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), R^1 is preferably an alkyl group having 6 to 20 carbon atoms, R^1 preferably has an average carbon number of from 10.8 to 12.8, the content of a component having an alkyl chain length which is contained in the highest content is 55% by mass or more and less than 97% by mass, and the average value of n is preferably from 2.5 to 3.7, and wherein the component (B) preferably contains a component in which n

= 0 in an amount of from 9.8 to 27% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of from 27 to 37% by mass.

[0059]

<21> The framed soap composition according to any one of the aforementioned <1> to <20>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), R^1 is preferably an alkyl group having 8 to 18 carbon atoms, R^1 preferably has an average carbon number of from 10.8 to 12.8, the content of a component having an alkyl chain length which is contained in the highest content is preferably 55% by mass or more and less than 97% by mass, and the average value of n is preferably from 2.5 to 3.4, and wherein the component (B) preferably contains a component in which $n = 0$ in an amount of from 9.9 to 27% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of from 27 to 36.5% by mass.

<22> The framed soap composition according to any one of the aforementioned <1> to <21>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), R^1 is preferably an alkyl group having 8 to 16 carbon atoms, R^1 preferably has an average carbon number of from 10.8 to 12.5, the content of a component having an alkyl chain length which is contained in the highest content is preferably from 60 to 95% by mass, and the average value of n is preferably

from 2.8 to 3.4, and wherein the component (B) preferably contains a component in which $n = 0$ in an amount of from 9.9 to 16% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of from 27 to 36.5% by mass.

<23> The framed soap composition according to any one of the aforementioned <1> to <22>, wherein, in the alkyl ether carboxylic acid or the salt thereof of the component (B), in the formula (1), R^1 is preferably an alkyl group having 10 to 16 carbon atoms, R^1 preferably has an average carbon number of from 12.1 to 12.4, the content of a component having an alkyl chain length which is contained in the highest content is preferably from 70 to 95% by mass, and the average value of n is preferably from 2.8 to 3.1, and wherein the component (B) preferably contains a component in which $n = 0$ in an amount of from 9.9 to 15% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of from 35 to 36.1% by mass.

[0060]

<24> The framed soap composition according to any one of the aforementioned <1> to <23>, wherein the content of the alkyl ether carboxylic acid or the salt thereof of the component (B) in terms of an acid is preferably from 3 to 20% by mass and more preferably from 5 to 15% by mass of the total composition.

<25> The framed soap composition according to any one of the aforementioned <1> to <24>, wherein the mass ratio of the content of the components (A) and (B) in terms of acids, $(B) / ((A) + (B))$, is preferably 0.05 or more, more preferably 0.06 or more, preferably 0.55 or less, and more preferably 0.5 or less.

<26> The framed soap composition according to any one of the aforementioned <1> to <25>, wherein the salt of the component (C) is an inorganic salt or an organic acid salt.

<27> The framed soap composition according to any one of the aforementioned <1> to <26>, wherein in the salt of the component (C), the inorganic salt is preferably at least one selected from the group consisting of inorganic salts of halogen, sulfuric acid, sulfurous acid or phosphoric acid with alkali metal, alkaline earth metal or aluminum.

<28> The framed soap composition according to any one of the aforementioned <1> to <27>, wherein in the salt of the component (C), the inorganic salt is preferably at least one selected from the group consisting of sodium chloride, potassium chloride, sodium sulfate, potassium sulfate, magnesium chloride, magnesium sulfate, aluminum chloride, and aluminum sulfate.

[0061]

<29> The framed soap composition according to any one of the aforementioned <1> to <26>, wherein in the salt of

the component (C), the organic acid salt is preferably at least one selected from organic acid salts of acids containing a sulfate group having 8 to 22 carbon atoms with alkali metal, alkaline earth metal, or aluminum.

<30> The framed soap composition according to any one of the aforementioned <1> to <26>, wherein in the salt of the component (C), the organic acid salt is preferably at least one selected from organic acid salts of acids containing a carboxylic acid having 6 or less carbon atoms with alkali metal, alkaline earth metal, or aluminum.

<31> The framed soap composition according to any one of the aforementioned <1> to <26>, wherein in the salt of the component (C), the organic acid salt is preferably at least one selected from the group consisting of aluminum lactate, sodium lactate, and sodium lauryl sulfate.

<32> The framed soap composition according to any one of the aforementioned <1> to <31>, wherein the content of the salt of the component (C) is preferably from 0.1 to 6% by mass and more preferably from 0.5 to 5% by mass of the total composition.

[0062]

<33> The framed soap composition according to any one of the aforementioned <1> to <32>, wherein the content of water of the component (D) is preferably 10% by mass or more, more preferably 15% by mass or more, preferably 85% by mass or less, more preferably 65% by mass or less of

the total composition, and is preferably from 10 to 85% by mass, and more preferably from 15 to 65% by mass of the total composition.

<34> The framed soap composition according to any one of the aforementioned <1> to <33>, wherein the composition can comprise (E) a polyol.

[0063]

<35> The framed soap composition according to the aforementioned <34>, wherein the polyol of the component (E) is preferably at least one selected from 1,3-butylene glycol, propylene glycol, isoprene glycol, glycerin, sorbitol, xylitol, mannitol, glucose, sucrose, trehalose, polyethylene glycol and polypropylene glycol.

<36> The framed soap composition according to the aforementioned <34> or <35>, wherein the content of the polyol of the component (E) is preferably from 1 to 40% by mass, more preferably from 3 to 35% by mass, and even more preferably from 5 to 25% by mass of the total composition.

<37> The framed soap composition according to any one of the aforementioned <1> to <36>, wherein the composition can comprise (F) a nonionic surfactant.

[0064]

<38> The framed soap composition according to the aforementioned <37>, wherein the nonionic surfactant of the component (F) is preferably a compound which has a polyoxyethylene group having an average number of moles

of EO added of preferably from 6 to 150 and more preferably from 10 to 50 as a hydrophilic group and an alkyl group having preferably 10 to 18 carbon atoms and more preferably 12 to 14 carbon atoms as a hydrophobic group.

<39> The framed soap composition according to the aforementioned <37> or <38>, wherein the nonionic surfactant of the component (F) has preferably an HLB of 8 or more and more preferably an HLB of 10 or more.

<40> The framed soap composition according to any one of the aforementioned <37> to <39>, wherein the nonionic surfactant of the component (F) is preferably polyethylene glycol (12) monolaurate (HLB 13.7), polyoxyethylene (23) lauryl ether (HLB 16.9), polyoxyethylene (30) lauryl ether (HLB 18), and polyoxyethylene (20) sorbitan monolaurate (HLB 16.7), and more preferably polyethylene glycol (12) monolaurate (HLB 13.7) and polyoxyethylene (20) sorbitan monolaurate (HLB 16.7).

[0065]

<41> The framed soap composition according to any one of the aforementioned <37> to <40>, wherein the content of the nonionic surfactant of the component (F) is preferably from 0.1 to 25% by mass, more preferably from 0.5 to 20% by mass, even more preferably from 1 to 15% by mass, and even more preferably from 5 to 15% by mass of a total composition.

<42> The framed soap composition according to any one of the aforementioned <37> to <41>, wherein the nonionic surfactant of the component (F) is preferably a hydroxy acid ester surfactant, monoglyceride surfactant, sucrose ester surfactant, or lactic acid ester surfactant.

<43> The framed soap composition according to any one of the aforementioned <1> to <42>, wherein the composition comprises air bubbles, and the volume fraction of the air bubbles contained is preferably at least 5% or more, more preferably 15% or more, and more preferably 95% or less.

[0066]

<44> A make-up removing cleanser comprising the framed soap composition according to any one of the aforementioned <1> to <43>.

<45> Use of the framed soap composition according to any one of the aforementioned <1> to <43> for producing a make-up cosmetic cleanser which is applied to made-up skin to thereby remove make-up cosmetics.

<46> Use of the framed soap composition according to any one of the aforementioned <1> to <43> for producing framed soap which is applied to skin in the presence of water for washing by rinsing with water.

[0067]

<Measurement method>

In the present invention, the alkyl composition, the distribution of the moles of EO added, and the ratio of each component of the alkyl ether carboxylic acid were

measured by the following analytical method with gas chromatography (GC).

[0068]

(GC analytical conditions)

GC instrument; the product of Agilent Technologies, 7890A Column; the product of Agilent Technologies, DB-5 (30 m, an inner diameter of 0.25 mm, a film thickness of 0.25 μm)

Detector; FID

Carrier; helium gas, 1 mL/min

Conditions of temperature rising; temperature is raised at 5°C/min from 100°C to 325°C, and thereafter, maintained at 325°C for 35 minutes.

[0069]

(Method of sample pretreatment)

Into 50 mL of methanol, 150 mg of alkyl ether carboxylic acid was dissolved. Also, the framed soap composition was taken in an amount of 150 mg in terms of alkyl ether carboxylic acid equivalent and dissolved in 50 mL of methanol. Also, when the framed soap composition contained a strong anionic surfactant such as polyoxyethylene alkyl ether sulfate, the framed soap composition was collected in such an amount that the strong anionic surfactant was 250 mg or less. From these solutions, 1 mL was taken and applied to a solid phase cartridge (manufactured by Biotage Japan Ltd., Isolute SAX, 1 g, 3 mL, 500-0100-B) which had been conditioned

with 4 mL of methanol in advance, and the filtrate was received in a 10 mL round-bottom test tube. Subsequently, the eluate which was eluted with 6 mL of a solution of 4.6 g of formic acid in 100 mL of methanol was also collected in the same test tube. The solution thus collected was set in a block heater heated to 50°C, to which nitrogen gas was blown in, and the solution was concentrated to approximately 1 mL, which was then dried at room temperature by further blowing nitrogen gas. To the resulting product, 2 mL of a diazomethane-ether solution was added, and the resulting solution was left to stand at room temperature for 10 minutes while stirring to carry out derivatization. Subsequently, nitrogen gas was blown in at room temperature and the solution was concentrated to 500 μ L or less, to which chloroform was then added to bring the total volume to 500 μ L, and the resulting product was subjected to GC analysis.

It is to be noted that the diazomethane-ether solution was prepared by the following procedure using a diazomethane generator (manufactured by Miyamoto Riken Ind. Co., Ltd., GM-50). A first receiver and a second receiver, and the second receiver and a third receiver were connected using a silicone rubber plug and a Teflon (Registered trademark) tube. Into the second receiver, 0.8 g of N-methyl-N'-nitro-N-nitrosoguanidine was collected, to which 2.5 mL of ion exchange water was

added. Into the third receiver, 10 mL of tert-butyl methyl ether was collected. The first, second, and third receivers were cooled on ice. Subsequently, the second receiver was fitted with a plastic syringe into which 3 mL of a solution of 20 g of sodium hydroxide dissolved in 100 mL of ion exchange water was placed. This aqueous solution of sodium hydroxide was slowly added dropwise to generate diazomethane gas, and nitrogen gas was gently blown in from the first receiver side to dissolve the diazomethane gas in tert-butyl methyl ether in the third receiver, whereby a diazomethane-ether solution was obtained.

The following reagents were used in the aforementioned sample pretreatment.

Methanol (manufactured by Kanto Chemical Co., Inc., for high performance liquid chromatography, 25183-1B)

Formic acid (manufactured by Wako Pure Chemical Industries, Ltd., special grade chemical, 066-00461)

Chloroform (manufactured by Kanto Chemical Co., Inc., CICA first grade, 07278-01)

N-Methyl-N'-nitro-N-nitrosoguanidine (manufactured by Kanto Chemical Co., Inc., CICA first grade, 25596-51)

Tert-butyl methyl ether (manufactured by Kanto Chemical Co., Inc., CICA special grade, 04418-00)

Sodium hydroxide (manufactured by Wako Pure Chemical Industries, Ltd., special grade, 196-13761)

[0070]

<Production Example>

The alkyl ether carboxylic acid of the component (B) used in the framed soap composition of the present invention can be produced, for example, as follows. Unless otherwise noted, "%" represents % by mass.

[0071]

Production Example 1

Into a stainless-steel autoclave equipped with stirring and temperature controlling functions, 1144 g (6.14 mol) of lauryl alcohol [trade name: KALCOL 2098, manufactured by Kao Corporation], 60.2 g (0.281 mol) of myristyl alcohol [trade name: KALCOL 4098, manufactured by Kao Corporation], and 2.68 g (0.0478 mol) of potassium hydroxide were placed and dehydration was performed under reduced pressure. Subsequently, 996 g (22.6 mol) of ethylene oxide (EO) was introduced at 155°C and reactions were allowed to proceed at a reaction temperature of 155°C and a reaction pressure of 0.4 MPa for two hours. Upon completion of the reaction, the resulting mixture was stirred for 30 minutes at 80°C under a reduced pressure condition of 6 kPa. Then, after removing unreacted ethylene oxide, nitrogen was introduced to normalize the pressure, and 4.82 g (0.0482 mol) of 90% lactic acid was added into the autoclave, followed by stirring at 80°C for 30 minutes, whereby alkyl ethoxylate having 3.55 moles of EO added (hereinbelow, also referred to as "the produced AE") was obtained.

Into a glass reaction container with stirring and temperature controlling functions and an oxygen gas introduction tube, 90 g (0.2 mol) of the aforementioned product, 16.7 g of a 48% aqueous solution of sodium hydroxide (0.2 mol in terms of sodium hydroxide), 0.9 g of a palladium-platinum-bismuth-based catalyst (4% of palladium, 1% of platinum and 5% of bismuth are supported on activated carbon, and 50% of water), and 494.4 g of water were each placed. While stirring, the liquid temperature was raised to 70°C, and while blowing oxygen in at a ratio of 27 mol% (with respect to the produced AE / hour), catalytic oxidation reactions were allowed to proceed at a reaction temperature of 70°C for 3.5 hours. The rate of reaction was 89%.

Upon completion of the reaction, the catalyst was filtered out from the reaction solution to provide an aqueous solution of sodium salt of alkyl ether carboxylic acid. Subsequently, 35% hydrochloric acid was added, and a liquid separation operation was performed to provide alkyl ether carboxylic acid, which will be referred to as EC1.

[0072]

As a result of gas chromatography analysis, it was found that, in the formula (1), $M = H$, R^1 had lauryl group / myristyl group at a ratio of 95 / 5, the average carbon number was 12.1, and the average value of n was 2.8, and EC1 contained a component in which $n = 0$ in an

amount of 14.7% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 36.1% by mass.

Further, it was also found that the ratio of each of the components having different numbers of moles of EO added, as calculated from the measurement value of the maximum component of the composition of R^1 , was as follows; (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.22 : 1.23 : 1.06 : 0.83.

[0073]

Production Example 2

According to Production Example 1, EO was reacted with a raw material containing a mixture of decyl alcohol [trade name: KALCOL 1098, manufactured by Kao Corporation], lauryl alcohol [trade name: KALCOL 2098, manufactured by Kao Corporation], myristyl alcohol [trade name: KALCOL 4098, manufactured by Kao Corporation], and cetyl alcohol [trade name: KALCOL 6098, manufactured by Kao Corporation] at a mass ratio of 10 / 70 / 15 / 5 to provide alkyl ethoxylate having 3.55 moles of EO added. In the same manner as in Production Example 1, the alkyl ethoxylate thus obtained was subjected to an oxidation reaction, and the resulting alkyl ether carboxylate was

subjected to hydrochloric acid treatment, whereby alkyl ether carboxylic acid was obtained.

[0074]

As a result of gas chromatography analysis, it was found that, in the formula (1), $M = H$, R^1 had decyl group/lauryl group/myristyl group/ palmityl group at a ratio of 10 / 70 / 15 / 5, the average carbon number was 12.3, and the average value of n was 3.3, and the alkyl ether carboxylic acid contained a component in which $n = 0$ in an amount of 15.2% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 31.4% by mass.

Further, it was also found that the ratio of each of the components having different numbers of moles of EO added, as calculated from the measurement value of the maximum component of the composition of R^1 , was as follows; (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.07 : 1.00 : 0.85 : 0.67.

[0075]

Production Example 3

Into a glass reaction container with stirring and temperature controlling functions, 372 g (2.00 mol) of lauryl alcohol was placed, and while stirring, the liquid temperature was raised to 70°C. Then, while adding 256 g

(2.20 mol) of sodium monochloroacetate and 88 g (2.20 mol) of sodium hydroxide in divided portions, a reaction was allowed to proceed for five hours. Upon completion of the reaction, the precipitates were filtered out. Subsequently, 35% hydrochloric acid was added for acidification to obtain alkyl ether carboxylic acid (in the formula (1), $M = H$, R^1 was a lauryl group, and $n = 0$).
[0076]

Production Example 4

According to Production Example 1, EO was reacted with decyl alcohol as a raw material to provide alkyl ethoxylate having 3.55 moles of EO added. In the same manner as in Production Example 1, the alkyl ethoxylate thus obtained was subjected to an oxidation reaction, and the resulting alkyl ether carboxylate was subjected to hydrochloric acid treatment, whereby alkyl ether carboxylic acid was obtained.

As a result of gas chromatography analysis, it was found that, in the formula (1), $M = H$, R^1 was a decyl group, and the average value of n was 3.1, and the alkyl ether carboxylic acid contained a component in which $n = 0$ in an amount of 16% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 37% by mass.

[0077]

Production Example 5

According to Production Example 1, EO was reacted with lauryl alcohol as a raw material to provide alkyl ethoxylate having 3.55 moles of EO added. In the same manner as in Production Example 1, the alkyl ethoxylate thus obtained was subjected to an oxidation reaction, and the resulting alkyl ether carboxylate was subjected to hydrochloric acid treatment, whereby alkyl ether carboxylic acid was obtained.

As a result of gas chromatography analysis, it was found that, in the formula (1), $M = H$, R^1 was a lauryl group, and the average value of n was 3.1, and the alkyl ether carboxylic acid contained a component in which $n = 0$ in an amount of 16% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 37% by mass.

Further, it was also found that the ratio of each of the components having different numbers of moles of EO added, as calculated from the measurement value of the maximum component of the composition of R^1 , was as follows; (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.19 : 1.13 : 0.94 : 1.

[0078]

Production Example 6

According to Production Example 1, EO was reacted with myristyl alcohol as a raw material to provide alkyl ethoxylate having 3.55 moles of EO added. In the same manner as in Production Example 1, the alkyl ethoxylate thus obtained was subjected to an oxidation reaction, and the resulting alkyl ether carboxylate was subjected to hydrochloric acid treatment, whereby alkyl ether carboxylic acid was obtained.

As a result of gas chromatography analysis, it was found that, in the formula (1), $M = H$, R^1 was a myristyl group, and the average value of n was 3.1, and the alkyl ether carboxylic acid contained a component in which $n = 0$ in an amount of 16% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 37% by mass.

[0079]

Production Example 7

According to Production Example 1, EO was added to a raw material containing a mixture of lauryl alcohol and cetyl alcohol at a mass ratio of 20 / 80 to provide alkyl ethoxylate having 3.55 moles of EO added. In the same manner as in Production Example 1, the alkyl ethoxylate thus obtained was subjected to an oxidation reaction, and the resulting alkyl ether carboxylate was subjected to hydrochloric acid treatment, whereby alkyl ether carboxylic acid was obtained.

As a result of gas chromatography analysis, it was found that, in the formula (1), $M = H$, R^1 had lauryl group / palmityl group at a ratio of 20 / 80, and the average value of n was 3.1, and the alkyl ether carboxylic acid contained a component in which $n = 0$ in an amount of 16% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 37% by mass.

[0080]

Production Example 8

According to Production Example 1, EO was reacted with lauryl alcohol as a raw material to provide alkyl ethoxylate having 4.05 moles of EO added. In the same manner as in Production Example 1, the alkyl ethoxylate thus obtained was subjected to an oxidation reaction, and the resulting alkyl ether carboxylate was subjected to hydrochloric acid treatment, whereby alkyl ether carboxylic acid was obtained.

[0081]

As a result of gas chromatography analysis, it was found that, in the formula (1), $M = H$, R^1 was a lauryl group, the average value of n was 3.5, and the resulting alkyl ether carboxylic acid contained a component in which $n = 0$ in an amount of 11.4% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 30.6% by mass.

Further, it was also found that the ratio of each of the components having different numbers of moles of EO added, as calculated from the measurement value of the maximum component of the composition of R^1 , was as follows; (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.31 : 1.38 : 1.25 : 1.06.

[0082]

Production Example 9

Into a stainless-steel autoclave with stirring and temperature controlling functions, 1144 g (6.14 mol) of lauryl alcohol [trade name: KALCOL 2098, manufactured by Kao Corporation], 60.2 g (0.281 mol) of myristyl alcohol [trade name: KALCOL 4098, manufactured by Kao Corporation], and 2.6 g (0.0478 mol) of potassium hydroxide were placed and dehydration was performed under reduced pressure. Subsequently, 718 g (16.3 mol) of ethylene oxide (EO) was introduced at 155°C and a reaction was allowed to proceed at a reaction temperature of 155°C and a reaction pressure of 0.4 MPa for two hours. Upon completion of the reaction, the resulting mixture was cooled and then stirred for 30 minutes at 80°C under a reduced pressure condition of 6 kPa. Then, after removing unreacted ethylene oxide, nitrogen was introduced to normalize the pressure, and 4.82 g (0.0482

mol) of 90% lactic acid was added into the autoclave, followed by stirring at 80°C for 30 minutes, whereby alkyl ethoxylate having 2.55 moles of EO added was obtained.

Into a glass reaction container with stirring and temperature controlling functions, 600 g (2.00 mol) of the aforementioned product was placed, and while stirring, the liquid temperature was raised to 70°C. Then, while adding 256 g (2.20 mol) of sodium monochloroacetate and 88 g (2.20 mol) of sodium hydroxide in divided portions, a reaction was allowed to proceed for five hours. Upon completion of the reaction, 35% hydrochloric acid was added for acidification until pH was 2.8, and the resulting oil layer was collected to obtain alkyl ether carboxylic acid, which will be referred to as EC6.

[0083]

As a result of gas chromatography analysis, it was found that, in the formula (1), $M = H$, R^1 had lauryl group / myristyl group at a ratio of 94 / 6, the average carbon number was 12.1, and the average value of n was 3.1, and EC6 contained a component in which $n = 0$ in an amount of 9.9% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 35.4% by mass.

Further, it was also found that the ratio of each of the components having different numbers of moles of EO added, as calculated from the measurement value of the

maximum component of the composition of R^1 , was as follows; (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 1.65 : 1.92 : 1.74 : 1.32.

[0084]

In the Examples, EC2 was obtained by mixing each of the alkyl ether carboxylic acids produced in Production Examples 5, 6, and 7 at a mass ratio of 78.75 / 15 / 6.25.

[0085]

In the Examples, EC3 was obtained by mixing each of the alkyl ether carboxylic acid obtained in Production Examples 2 and 3 at a mass ratio of 90 / 10.

[0086]

In the Examples, EC4 was obtained by mixing each of EC1 obtained in Production Example 1 and the alkyl ether carboxylic acid obtained in Production Example 4 at a mass ratio of 40 / 60.

[0087]

In the Examples, EC5 was obtained by mixing each of the alkyl ether carboxylic acid obtained in Production Examples 2 and 8 at a mass ratio of 40 / 60.

[0088]

In the Examples, EC7 was obtained by mixing each of EC1 obtained in Production Example 1 and commercially

available AKYPO RLM45 (manufactured by Kao Corporation)
at a mass ratio of 50 / 50.

[0089]

In the Examples, EC8 was obtained by mixing each of
EC1 obtained in Production Example 1 and commercially
available AKYPO RLM100NV (manufactured by Kao
Corporation) at a mass ratio of 50 / 50.

[0090]

In the Examples, EC9 was obtained by mixing each of
EC1 obtained in Production Example 1 and commercially
available AKYPO RLM45 (manufactured by Kao Corporation)
at a mass ratio of 27 / 73.

[0091]

Also, the composition of the component (B) used in
Examples is as shown in Tables 1 and 2.

Also, for the average numbers of moles of EO added
of commercially available alkyl ether carboxylic acids
used in Examples (AKYPO RLM25 (manufactured by Kao
Corporation), AKYPO RLM45 (manufactured by Kao
Corporation), AKYPO RLM100NV (manufactured by Kao
Corporation), values provided in the catalogue supplied
by each vendor or values posted in the website of each
vendor were referred to. Unknown alkyl composition, the
amount of a component in which $n = 0$, and the total
amount of a component in which $n = 1$ and a component in
which $n = 2$ were analyzed by the aforementioned method.

[0092]

[Table 1]

	R1 (% by mass)				Average carbon number	Average number of moles of EO added	n=0 Content ratio	n=1, 2 Total amount
	C10	C12	C14	C16				
EC1	0	95	5	0	12.1	2.8	14.7%	36.1%
EC2	0	80	15	5	12.5	3.1	16.0%	32.5%
EC3	8	73	13.5	4.5	12.2	2.8	27.0%	27.1%
EC4	60	38	2	0	10.8	3.2	12.5%	34.8%
EC5	4	88	6	2	12.1	3.4	13.3%	31.0%
EC6	0	94	6	0	12.1	3.1	9.9%	35.4%

[0093]

[Table 2]

	R1(% by mass)				Average carbon number	Average number of moles of EO added	n=0 Content ratio	n=1, 2 Total amount
	C10	C12	C14	C16				
25CA *1	0	68	26	6	12.8	2.5	16.0%	32.5%
EC7	0	81.5	15.5	3	12.5	3.7	12.2%	33.7%
EC8	0	81.5	15.5	3	12.5	6.4	9.8%	28.2%
EC9	0	75.3	20.3	4.4	12.6	4.0	11.0%	32.5%
45CA *2	0	68	26	6	12.8	4.5	9.6%	31.2%
100NV *3	0	68	26	6	12.8	10.0	4.9%	20.4%

*1: AKYPO RLM25 (manufactured by Kao Corporation)

*2: AKYPO RLM45 (manufactured by Kao Corporation)

*3: AKYPO RLM100NV (manufactured by Kao Corporation)

[Examples]

[0094]

Examples 1 to 35 and Comparative Examples 1 to 5

The framed soap compositions having the compositions as shown in Tables 3 to 6 were produced, and viscosity of the molten soap, removability from the frame, hardness, an amount of soap scum adhered, glossiness, and lathering performance at low temperature were evaluated. The results are also shown in Tables 3 to 6.

[0095]

(Production method)

(1) Examples 1 to 14, 16 to 35, and Comparative Examples 1 to 5:

In a 1 L stainless container (a cylinder having a diameter of 104 mm and a height of 120 mm), the components (A) and (B) (further, components (E) and (F)) were placed and dissolved at 80°C. After dissolution, the components were stirred with propeller blades at a rotating speed of 100 rpm to homogeneity. To the components dissolved homogeneously, the component (C) dissolved in the component (D) was added, and the components were stirred again at 80°C to homogeneity. Subsequently, the rotating speed was increased to 200 rpm, and an alkali agent was gradually added. After addition was finished, stirring was continued to homogeneity for about 60 minutes. The mixture (molten soap) was produced so as to achieve a total amount of 400 g.

This mixture (molten soap) was poured into a balance dish BD-2 (a volume of 100 cc) manufactured by AS One Corporation, and then left to stand for 60 minutes in a freezer (about -20°C) to thereby solidify the soap. Subsequently, the soap was taken out from the freezer, placed into a sealed aluminum pillow, and left at room temperature for 18 hours to thereby obtain framed soap.

[0096]

(2) Example 15:

After the components (A) to (F) were mixed, an alkali agent was added thereto. The molten soap which was stirred for 60 minutes was whipped with a domestic hand mixer (National hand mixer MK-H3) to prepare molten soap containing air bubbles. Except that 30% of air bubbles in volume fraction were contained, framed soap was obtained in the same manner as the aforementioned (1). The molten soap containing air bubbles was poured into a container having a volume of 100 mL, and the mass of the composition W (g) was weighed. Then, the volume fraction of the air bubbles was calculated with "100 - W (%)." [0097]

(Evaluation method)

(1) Viscosity of the molten soap:

A cylindrical stainless container having a diameter of 104 mm and a height of 120 mm was filled with 400 g of the molten soap at 80°C. The stainless container was entirely immersed in a hot water tank containing hot water at 80°C to keep the temperature of the molten soap at 80°C. Stainless stirring blades (three, length: 45 mm and maximum width: 20 mm) was attached to the shaft tip of a stainless rod having a diameter of 8 mm. The stirring blades were mounted such that the center of the stirring blades was immersed in the center portion of the molten soap. The shaft end opposite to the stirring blades was attached to a torque meter (HEIDON TYPE YT). The stirring blades were rotated with a motor connected

to the torque meter. A shaft torque value of the torque meter (g/cm: the maximum value 500 g/cm) was read at a rotating speed of 200 rotations/minute.

The smaller the torque value, the better the framability because of the lower viscosity of the molten soap.

[0098]

(2) Removability from the frame:

Removability from the frame was evaluated from ease of removing the framed soap when the operation of removing the framed soap from the frame was carried out and the amount of soap left in the frame based on the following criteria.

The amount of soap left in the frame was calculated from the relationship between the total area of the frame (the total area obtained by summing the areas of the internal bottom and sides of the frame into which the soap is placed): T (cm^2) and the area of the frame surface in contact with the soap left in the frame : S (cm^2) based on the following calculation formula as the amount left: Z (%).

$$Z (\%) = S (\text{cm}^2) / T (\text{cm}^2) \times 100$$

4: The soap can be easily removed from the frame, and the amount left (Z) is less than 5%.

3: The soap can be removed from the frame, but the amount left (Z) is 5% or more and less than 10%.

2: The soap can be removed from the frame, but the amount left (Z) is 10% or more and less than 100%.

1: The soap remains attached to the frame and cannot be removed (The amount left (Z) is 100%).

[0099]

(3) Hardness:

A hand-held durometer (Koubunshi Keiki, Co., Ltd., ASKER durometer, type C) was pressed onto the surface of framed soap to measure the maximum value. A value at three points was measured, and the average value was adopted as the hardness of the soap.

If the soap had a hardness of 10 or more, it was defined that the soap was solidified.

[0100]

(4) Amount of soap scum adhered:

The obtained framed soap was dissolved in 20HD hard water at 60°C to thereby prepare a 6% aqueous solution. Subsequently, within one minute, a foamer container (160 mL; YF-9413, manufactured by Yoshino Kogyosho Co., Ltd.) was filled with the soap aqueous solution. The container was pushed once to apply foam (0.8 to 1.0 g) on a skin model (Skin model No. 10A (40s) #BLACK, normal surface, manufactured by Beaulax Co., Ltd.) color E1 (L1, a1, b1) of which had been measured. It is to be noted that a chroma meter (manufactured by Minolta, Inc., CR-300) was used for color measurement. The skin model on which the foam was applied was placed in a drying oven at 50°C and

left for about an hour to allow water to dry. Subsequently, the skin model was taken out of the oven and returned to the room temperature. Then, the skin model was rinsed with 2 mL of 20HD hard water using a dropper (2 mL) such that the water was spread entirely over the surface of the skin model. After the skin model was rinsed three times, moisture on the skin model was lightly wiped off with paper (Soft Prowiper S150, manufactured by Daio Paper Corporation). The skin model was naturally dried for further five minutes, and then the color E2 (L2, a2, b2) of the skin model was measured. A value at three points was measured, and the average value was adopted as E2. The color difference ΔE_{12} between E1 and E2 was adopted as the amount of scum adhered. ΔE_{12} was calculated using the following formula.

It is shown that the smaller the ΔE_{12} , the more difficult the soap scum to adhere.

$$\Delta E_{12} = \sqrt{\{(L2 - L1)^2 + (a2 - a1)^2 + (b2 - b1)^2\}}$$

[0101]

(5) Glossiness:

A hand-held gloss meter (Multi-Gloss 268, manufactured by Minolta, Inc.) was pressed onto the surface of the framed soap to thereby measure a gloss value at 60°. A value at three points was measured, and the average value was adopted as the glossiness.

[0102]

(6) Lathering performance at low temperature:

One hundred grams of the framed soap was immersed in water at 10°C for five seconds while held within both hands to wet the surface of the soap. Subsequently, the wet framed soap was rotated 10 times using the palms of the both hands, and then the soap was laid down. The palms of the both hands were rubbed together for lathering for 10 seconds, and the foam on the palms was observed. (Evaluation was performed by five persons, and the result was the average of the evaluations of the five persons.)

1: Foam is not produced at all.

2: Foam is produced over an area equivalent to a half of the area of a palm or smaller.

3: Foam is produced over an area larger than a half of the area of a palm.

4: A palm is entirely covered with foam.

[0103]

[Table 3]

Component (% by mass)	Example 1	Example 2	Example 3	Example 4	Example 5	Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4
(A) Lauric acid	30.00	20.00	40.00	30.00	30.00	30.00	20.00	40.00	30.00
(B) EC1	10.00	10.00	15.00	10.00	10.00				
(C) Sodium chloride	1.50	1.50	1.00	1.50	1.50				1.50
(D) Ion exchanged water	44.20	58.10	24.60	39.20	24.20	57.70	71.80	43.60	56.20
(E) Sorbitol									
Glycerin					15.00				
Polyoxyethylene (20) sorbitan monolaurate (HLB16.7) *4				5.00	5.00				
48%NaOH	14.30	10.40	19.40	14.30	14.30	12.30	8.20	16.40	12.30
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
(B)/((A)+(B))	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0
Viscosity of the molten soap (Torque value; g/cm)	400	80	400	50	50	50	50	>500	50
Removability from the frame	3	3	3	3	3	3	3	3	4
Hardness	56	60	85	53	85	91	76	77	89
Amount of soap scum adhered(ΔE)	12.1	11.5	8.2	3.4	6.1	20.1	23.4	25.9	-
Glossiness(60°)	6.9	4.6	5.3	8.6	13.2	6.7	5.7	8.8	-
Lathering performance at low temperature	3.4	3.4	3.6	3.6	3.8	1.4	1.6	1.4	1.0

*4: RHEODOL TW-L120 (manufactured by Kao Corporation)

[0104]

[Table 4]

Component (% by mass)		Example 6	Example 7	Example 8	Example 9	Example 10	Example 11	Example 12	Example 13	Example 14	Example 15	Example 16	Example 17	Example 18	Example 19	Example 20
(A)	Lauric acid	30.00	30.00	15.00	15.00	15.00		20.00	20.00	30.00	15.00	20.00	20.00	20.00	20.00	20.00
	Myristic acid			15.00	15.00	15.00	5.00				15.00					
	Palm kernel oil fatty acid (average molecular weight of 222.35) *5						25.00									
(B)	EC1	10.00	20.00	10.00	10.00	10.00	10.00	19.01	15.00		10.00	10.00	10.00	10.00		
	EC2														5.56	
	EC5															11.11
(C)	EC9									10.00						
	Sodium chloride	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50				0.50	5.00
	Sodium sulfate											1.00				
(D)	Sodium lauryl sulfate *6												1.00			
	Sodium lactate												1.00	1.00		
	Ion exchanged water	29.20	17.30	45.00	35.00	21.00	20.60	32.50	37.40	14.60	21.00	58.90	58.90	58.90	24.74	28.74
(E)	Sorbitol					10.00	10.00				10.00					
	Glycerin					5.00	5.00		15.00	15.00	5.00				35.00	5.00
	Polyoxyethylene (20) sorbitan monolaurate (HLB16.7) *4	15.00	15.00		5.00	10.00	10.00	15.00		15.00	10.00				5.00	20.00
(F)	Polyoxyethylene (12) monolaurate (HLB13.7) *7				5.00											
	48%NaOH	14.30	16.20	13.50	13.50	12.50	12.90	11.99	11.10	13.90	12.50	10.10	10.10	10.10	9.20	10.15
	Total amount	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
(B)/((A)+(B))		0.3	0.4	0.3	0.3	0.3	0.3	0.49	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.4
Viscosity of the molten soap (Torque value; g/cm)		50	300	100	50	200	220	50	400	50	200	50	70	50	50	50
Removability from the frame		3	3	3	4	4	4	3	3	4	4	3	3	3	4	4
Hardness		89	78	33	60	62	75	86	31	94	40	62	48	60	91	88
Amount of soap scum adhered(ΔE)		1.1	0.2	6.6	6.6	2.3	0.6	4.1	0.4	2.9	2.3	9.5	8.0	11.5	1.3	3.8
Glossiness (60°)		9.1	4.2	9.1	9.5	29.4	23.6	3.0	27.8	12.0	17.0	4.6	4.2	4.6	25.6	10.5

Lathering performance at low temperature	3.8	3.8	3.4	3.6	3.8	3.8	3.4	3.8	3.8	3.4	3.6	3.8	3.4	3.4	3.6	3.8
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*4: RHEODOL TW-L120 (manufactured by Kao Corporation)

*5: PALMAC 505 (manufactured by Acidchem)

*6: EMAL 10 powder (manufactured by Kao Corporation)

*7: EMANON 1112 (manufactured by Kao Corporation)

Example 15: 30% of air bubbles

[0105]

[Table 5]

Component (% by mass)		Example 21	Example 22	Example 23	Example 24	Example 25	Example 26	Example 27	Example 28	Example 29	Example 30	Example 31	Example 32	Comparative Example 5
(A)	Lauric acid	15.00	7.50	20.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	5.00
	Myristic acid	15.00	7.50	20.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	5.00
	Palm kernel oil fatty acid (average molecular weight of 222.35) *5													
(B)	EC1	10.00	10.00	10.00	3.00	5.00	20.00	10.00	10.00	10.00	10.00	10.00	10.00	20.00
	EC2													
	EC5													
	EC9													
(C)	Sodium chloride	1.50	1.50	1.50	1.50	1.50	1.50	0.50	5.00	1.50	1.50	1.50	1.50	1.00
	Sodium sulfate													
	Sodium lauryl sulfate *6													
	Sodium lactate													
(D)	Ion exchanged water	26.00	46.35	12.40	34.26	31.90	14.18	27.00	22.50	31.00	11.00	35.00	16.00	61.78
(E)	Sorbitol	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	2.50	12.50	5.00	5.00	0.00
	Glycerin	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	2.50	12.50	5.00	5.00	0.00
(F)	Polyoxyethylene (20) sorbitan monolaurate (HLB16.7) *4	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	1.00	20.00	0.00
	Polyoxyethylene (12) monolaurate (HLB13.7) *7													
	48%NaOH	12.50	7.15	16.10	11.24	11.60	14.32	12.50	12.50	12.50	12.50	12.50	12.50	7.22
Total amount		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
(B)/((A)+(B))		0.3	0.4	0.2	0.1	0.1	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.7
Viscosity of the molten soap (Torque value; g/cm)		100	30	450	50	50	280	90	140	200	170	100	50	50
Removability from the frame		4	3	4	4	4	4	4	4	4	4	4	4	1
Hardness		68	10	88	87	85	63	52	86	65	84	28	83	(Liquid)
Amount of soap scum adhered(ΔE)		3.4	1.6	9.2	5.9	4.4	1.2	1.8	2.4	2.8	1.6	6.5	1.6	-

Glossiness (60°)	10.8	56.2	11.0	12.3	10.4	11.0	15.0	11.9	10.7	17.0	25.6	13.0	-
Lathering performance at low temperature	3.8	3.4	3.8	3.4	3.4	3.8	3.8	3.4	3.8	3.8	3.6	3.8	-

*4: RHEODOL TW-L120 (manufactured by Kao Corporation)

*5: PALMAC 505 (manufactured by Acidchem)

*6: EMAL 10 powder (manufactured by Kao Corporation)

*7: EMANON 1112 (manufactured by Kao Corporation)

[0106]

[Table 6]

Component (% by mass)		Example 33	Example 34	Example 35
(A)	Lauric acid	15.00	10.00	17.00
	Myristic acid			17.00
(B)	EC1	1.00	1.00	2.70
(C)	Sodium chloride	1.00	1.00	1.50
(D)	Ion exchanged water	76.70	83.70	28.80
(E)	Sorbitol			10.00
	Glycerin			10.00
48%NaOH		6.30	4.30	13.00
Total		100.00	100.00	100.00
(B)/((A)+(B))		0.06	0.09	0.14
Viscosity of the molten soap (Torque value; g/cm)		50	50	100
Removability from the frame		4	4	4
Hardness		50	36	93

[0107]

Examples 36 to 41

Framed soap compositions having the compositions shown in the following can be produced in the same manner as Examples 1 to 35. Any of the framed soap compositions to be obtained has excellent dispersibility of scum, suppresses getting bathroom dirty, and has good lathering performance at low temperature.

[0108]

Example 36 (Framed soap composition)

(Components)

Lauric acid	15.0 (% by mass)
Myristic acid	15.0

EC3	10.0
Sodium chloride	1.5
Sorbitol	10.0
Glycerin	5.0
Polyoxyethylene (20) sorbitan monolaurate (HLB: 16.7)*4	10.0
Sodium cocoyl isethionate*8	3.0
48% NaOH	12.5
Purified water	18.0
Total	100

*4: RHEODOL TW-L120 (manufactured by Kao Corporation)

*8: Pureact I-78C (manufactured by Innospec Active
Chemicals LLC)

[0109]

Example 37 (Framed soap composition)

(Components)

Lauric acid	15.0 (% by mass)
Myristic acid	15.0
EC4	10.0
Sodium chloride	1.5
Sorbitol	10.0
Glycerin	5.0
Polyoxyethylene (20) sorbitan monolaurate (HLB: 16.7)*4	10.0
Sodium cocoyl isethionate*8	3.0
48% NaOH	12.5
Purified water	18.0

Total 100

*4: RHEODOL TW-L120 (manufactured by Kao Corporation)

*8: Pureact I-78C (manufactured by Innospec Active
Chemicals LLC)

[0110]

Example 38 (Framed soap composition)

(Components)

Lauric acid	15.0 (% by mass)
Myristic acid	15.0
EC6	10.0
Sodium chloride	1.5
Sorbitol	10.0
Glycerin	5.0
Polyoxyethylene (20) sorbitan monolaurate (HLB: 16.7)*4	10.0
Sodium cocoyl isethionate*8	3.0
48% NaOH	12.5
Purified water	18.0
Total	100

*4: RHEODOL TW-L120 (manufactured by Kao Corporation)

*8: Pureact I-78C (manufactured by Innospec Active
Chemicals LLC)

[0111]

Example 39 (Framed soap composition)

(Components)

Lauric acid	15.0 (% by mass)
Myristic acid	15.0

EC7	10.0
Sodium chloride	1.5
Sorbitol	10.0
Glycerin	5.0
Polyoxyethylene (20) sorbitan monolaurate (HLB: 16.7)*4	10.0
Sodium cocoyl isethionate*8	3.0
48% NaOH	12.5
Purified water	18.0
Total	100

*4: RHEODOL TW-L120 (manufactured by Kao Corporation)

*8: Pureact I-78C (manufactured by Innospec Active
Chemicals LLC)

[0112]

Example 40 (Framed soap composition)

(Components)

Lauric acid	15.0 (% by mass)
Myristic acid	15.0
EC8	10.0
Sodium chloride	1.5
Sorbitol	10.0
Glycerin	5.0
Polyoxyethylene (20) sorbitan monolaurate (HLB: 16.7)*4	10.0
Sodium cocoyl isethionate*8	3.0
48% NaOH	12.5
Purified water	18.0

Total 100

*4: RHEODOL TW-L120 (manufactured by Kao Corporation)

*8: Pureact I-78C (manufactured by Innospec Active
Chemicals LLC)

[0113]

Example 41 (Framed soap composition)

(Components)

Lauric acid 15.0 (% by mass)

Myristic acid 15.0

25CA*1 10.0

Sodium chloride 1.5

Sorbitol 10.0

Glycerin 5.0

Polyoxyethylene (20) sorbitan monolaurate (HLB: 16.7)*4
10.0

Sodium cocoyl isethionate*8 3.0

48% NaOH 12.5

Purified water 18.0

Total 100

*1: AKYPO RLM25 (manufactured by Kao Corporation)

*4: RHEODOL TW-L120 (manufactured by Kao Corporation)

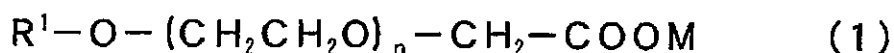
*8: Pureact I-78C (manufactured by Innospec Active
Chemicals LLC)

CLAIMS

1. A framed soap composition comprising the following components (A), (B), (C) and (D):

(A) from 10 to 50% by mass of a fatty acid having 8 to 22 carbon atoms or a sodium salt thereof,

(B) from 1 to 25% by mass of an alkyl ether carboxylic acid or a salt thereof represented by the formula (1)



wherein R^1 represents an alkyl group having 10 to 16 carbon atoms, n represents a number of from 0 to 20, and M represents a hydrogen atom, alkali metal, alkaline earth metal, ammonium, or organic ammonium,

wherein R^1 has an average carbon number of from 12.1 to 12.8, and

wherein the alkyl ether carboxylic acid or the salt thereof contains a component in which $n = 0$ in an amount of 9.9 to 16% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of 27 to 36.1% by mass,

(C) from 0.1 to 10% by mass of a salt other than the components (A) and (B), and

(D) water, and

wherein the mass ratio of the content of the components (A) and (B) in terms of acids, $(B) / ((A) + (B))$, is from 0.04 to 0.6.

2. The framed soap composition according to claim 1, wherein the component (C) is a salt selected from the group consisting of salts of halogen, sulfuric acid, sulfurous acid or phosphoric acid with alkali metal, alkaline earth metal or aluminum, and salts of an acid containing a sulfate group having 8 to 22 carbon atoms or an acid containing a carboxylic acid having 6 or less carbon atoms with alkali metal, alkaline earth metal, or aluminum.

3. The framed soap composition according to claim 1 or 2, wherein the component (C) is at least one salt selected from the group consisting of sodium chloride, potassium chloride, sodium sulfate, potassium sulfate, magnesium chloride, magnesium sulfate, aluminum chloride, aluminum sulfate, aluminum lactate, sodium lactate, and sodium lauryl sulfate.

4. The framed soap composition according to any one of claims 1 to 3, wherein, in the component (B), in the formula (1), an average value of n is from 1.5 to 10.

5. The framed soap composition according to any one of claims 1 to 4, wherein, in the component (B), in the formula (1), R^1 is an alkyl group having 10 to 16 carbon atoms, the average value of n is from 2.5 to 4.0, and the content of a component in which $n = 0$ is from 9.9 to 16% by mass.

6. The framed soap composition according to any one of claims 1 to 5, wherein, in the component (B), in the formula (1), R^1 is an alkyl group having 10 to 16 carbon atoms, an average value of n is from 2.5 to 3.7, and the content of a component in which $n = 0$ is from 9.9 to 16% by mass.

7. The framed soap composition according to any one of claims 1 to 6, wherein, in the component (B), in the formula (1), R^1 is an alkyl group having 10 to 16 carbon atoms and an average value of n is from 2.5 to 3.4.

8. The framed soap composition according to any one of claims 1 to 7, wherein, in the component (B), in the formula (1), R^1 is an alkyl group having 10 to 16 carbon atoms, R^1 has the average carbon number of from 12.1 to 12.5, the average value of n is from 2.8 to 3.4, the alkyl ether carboxylic acid or the salt thereof contains a component in which $n = 0$ in an amount of from

9.9 to 16% by mass, and a component in which $n = 1$ and a component in which $n = 2$ in a total amount of from 27 to 36.1% by mass.

9. The framed soap composition according to any one of claims 1 to 8, wherein, the component (B) has, in the formula (1), a ratio of (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) = 1 : 0.99 to 3.50 : 0.89 to 3.00 : 0.76 to 3.00 : 0.63 to 1.52 in the component having the alkyl chain length of the highest content in the composition of R^1 .

10. The framed soap composition according to any one of claims 1 to 9, wherein, in the component (B), in the formula (1), R^1 contains two or more alkyl groups, and the content of a component having an alkyl chain length which is contained in the highest content is 55% by mass or more and less than 97% by mass.

11. The framed soap composition according to any one of claims 1 to 10, wherein the component (B) contains, in the formula (1), a component in which $n = 0$ in an amount of 9.9% by mass or more and less than 12% by mass and has a ratio of (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) of 1 : 1.53 to 1.87 : 1.59 to 2.25 : 1.33 to 2.16 : 1.14 to 1.52 in the component having the alkyl chain length of the highest content in the composition of R^1 , or contains a component in which $n = 0$ in an amount of from 12 to 17% by mass and has a ratio of (the mass of a component in which $n = 0$) : (the mass of a component in which $n = 1$) : (the mass of a component in which $n = 2$) : (the mass of a component in which $n = 3$) : (the mass of a component in which $n = 4$) of 1 : 0.99 to 1.34 : 0.89 to 1.40 : 0.76 to 1.23 : 0.63 to 1 in the component having

the alkyl chain length of the highest content in the composition of R¹.

12. The framed soap composition according to any one of claims 1 to 11, further comprising (E) a polyol of from 1 to 40% by mass.

13. The framed soap composition according to any one of claims 1 to 12, further comprising (F) a nonionic surfactant of from 0.1 to 25% by mass.

14. The framed soap composition according to any one of claims 1 to 13, comprising at least 5% of air bubbles in volume fraction.

15. The framed soap composition according to any one of claims 1 to 14, wherein the mass ratio of the content of the components (A) and (B) in terms of acids, $(B) / ((A) + (B))$, is from 0.05 to 0.55.

16. A make-up removing cleanser comprising the framed soap composition according to any one of claims 1 to 15.