DESCRIPTION

LIQUID ORAL COMPOSITION

Technical Field

The present invention relates to a liquid oral composition, such as a gargle and a mouth wash, having improved storage stability and reduced or suppressed bitterness attributed to a quaternary ammonium salt disinfectant.

Background Art

In general, mouth washes and gargles are pharmaceutical preparations that incorporate a disinfectant for the purposes of disinfecting or sterilizing the oral cavity and the throat, treating various inflammatory diseases, and preventing infectious diseases such as a cold. Some of the mouth washes and gargles are directly used, others are diluted in water before use.

Widely used disinfectants for sterilizing/disinfecting the oral cavity and the throat are quaternary ammonium salt disinfectants such as cetylpyridinium chloride. However, the quaternary ammonium salt disinfectants are responsible for bitterness, astringency, etc. As a result, while adults can continuously use products incorporating the quaternary ammonium salt disinfectants, it is difficult for children to continuously use them due to bitterness and astringency. Techniques of suppressing such bitterness and astringency using sweetening agents have been studied in, for example, Patent Literatures 1 to 6, but are not satisfactory.

Also, Patent Literature 7 proposes a gargle in which a cooling agent and a commonly used fragrance (e.g., l-menthol, mint oil, eucalyptus oil and clove oil) are solubilized with ethanol and a surfactant for improving storage stability. However, in this proposal, feelings and bitterness attributed to the ethanol and surfactant are

not unpleasant to children, among others.

In addition, regarding the usage form, liquid preparations that are directly used without dilution have an advantage that they can be used in no time when one wants to use them. However, the transportation cost increases when such liquid preparations (products) are transported to stores for sale, and a large space is required for storing them. Furthermore, when users buy and take them to their houses, such products are voluminous and require a storage space.

Meanwhile, concentrated liquid preparations that are diluted upon use contain ingredients at high concentrations, and tend to be inferior in stability to involve, for example, precipitation and white turbidity. Such concentrated liquid preparations are made to incorporate a surfactant and ethanol for improving stability (see Patent Literature 7). Incorporation of the surfactant may increase bitterness upon use or stimulate the mucous membrane in the oral cavity. The ethanol often peels off the mucous membrane in the oral cavity upon use or stimulates the oral cavity. Thus, the ethanol causes unpleasant feelings in, among others, children. This makes it difficult to perform continuous use.

Thus, demand has arisen for liquid oral compositions (gargles and mouth washes) incorporating a quaternary ammonium salt disinfectant (e.g., cetylpyridinium chloride) that have remarkably suppressed bitterness and stimulation (i.e., improved tastes), high convenience and excellent storage stability.

Patent Literature 1: Japanese Patent Application Laid-Open (JP-A) No. 2005-247713

Patent Literature 2: JP-A No. 2007-15995

Patent Literature 3: JP-A No. 2006-306768

Patent Literature 4: JP-A No. 2001-72562

Patent Literature 5: JP-A No. 2000-26260

Patent Literature 6: JP-A No. 08-268855

Patent Literature 7: JP-A No. 07-25735

Disclosure of Invention

The present invention aims to provide a liquid oral composition that has remarkably suppressed bitterness and stimulation (i.e., improved tastes), high convenience and excellent storage stability, although it incorporates a quaternary ammonium salt disinfectant.

The present inventors conducted extensive studies to solve the above existing problems, and as a result have fount that a liquid oral composition including (A) a quaternary ammonium salt disinfectant, (B) an acetic acid ester and a lactone in a total amount of 0.001% by mass to 0.5% by mass, and (C) at least one selected from a polyhydric alcohol and a sugar alcohol in an amount of 40% by mass to 80% by mass has remarkably suppressed bitterness and stimulation of the quaternary ammonium salt disinfectant (i.e., improved tastes), high convenience and excellent storage stability during transportation.

The present invention is based on the above finding obtained by the present inventors. Means for solving the above existing problems are as follows.

<1> A liquid oral composition including:

(A) a quaternary ammonium salt disinfectant,

(B) an acetic acid ester and a lactone in a total amount of 0.001% by mass to 0.5% by mass, and

(C) at least one selected from a polyhydric alcohol and a sugar alcohol in an amount of 40% by mass to 80% by mass.

<2> The liquid oral composition according to <1>, wherein the acetic acid ester is ethyl acetate, butyl acetate, propyl acetate, isopropyl acetate, amyl acetate or isoamyl acetate, and the lactone is γ-nonalactone, γ-decalactone, δ-decalactone, γ-undecalactone or δ-undecalactone.

<3> The liquid oral composition according to one of <1> and <2>, wherein the ratio B_1/B_2 is 0.1 to 5.0, where B_1 denotes the mass of the acetic acid ester and B_2 denotes the mass of the lactone.

<4> The liquid oral composition according to any one of <1> to <3>, wherein the ratio B/A is 0.04 to 2.00, where B denotes the total mass of the acetic acid ester and the lactone, and A denotes the mass of the quaternary ammonium salt disinfectant.

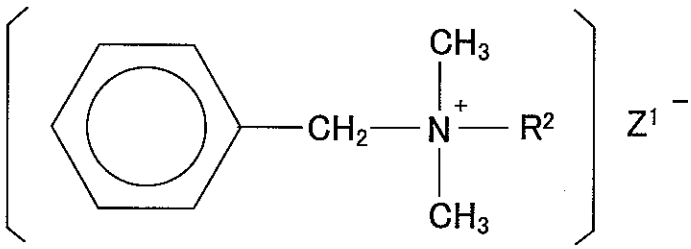
The present invention can provide a liquid oral composition that has remarkably suppressed bitterness and stimulation (i.e., improved tastes), high convenience and excellent storage stability, although it incorporates a quaternary ammonium salt disinfectant. This liquid oral composition can solve the above-existing problems.

Best Mode for Carrying Out the Invention

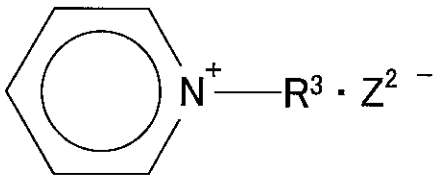
The liquid oral composition of the present invention includes (A) a quaternary ammonium salt disinfectant, (B) an acetic acid ester and a lactone, and (C) at least one selected from polyhydric alcohols and sugar alcohols; and, if necessary, further includes other ingredients.

- (A) Quaternary ammonium salt disinfectant -

The quaternary ammonium salt disinfectant (A) is not particularly limited and may be appropriately selected depending on the intended purpose. Preferred examples include compounds represented by the following General Formulas (A1) and General Formula (A2).



General Formula (A1)



General Formula (A2)

In General Formulas (A1) and (A2), R^2 and R^3 each represent a C8 to C18 hydrocarbon group or a hydrocarbon group having an ether bond.

Z^1 and Z^2 each represent a halogen atom, an amino acid or an aliphatic fatty acid.

Specific examples of the quaternary ammonium salt disinfectant (A) include cetylpyridinium chloride, benzethonium chloride and benzalkonium chloride. These may be used individually or in combination. Of these, cetylpyridinium chloride and benzethonium chloride are preferred, with cetylpyridinium chloride being particularly preferred.

The amount of the quaternary ammonium salt disinfectant (or the total amount when two or more disinfectants are used in combination) is preferably 0.05% by mass to 1% by mass, more preferably 0.1% by mass to 0.5% by mass.

When the amount of the quaternary ammonium salt disinfectant is less than 0.05% by mass, sufficient disinfection performance cannot be obtained in some cases. When the amount of the quaternary ammonium salt disinfectant is more than 1% by mass, the obtained liquid oral composition may have strong bitterness and be difficult to use.

- (B) Acetic acid ester and lactone -

The acetic acid ester and lactone (B) is a mixture of an acetic acid ester and a lactone.

The acetic acid ester is preferably those having 4 to 8 carbon atoms in total. The lactone is preferably those having 9 to 11 carbon atoms in total.

The acetic acid esters having 4 to 8 carbon atoms have refreshing, sweet smell and taste. However, when the amount of them is large, sweetness and taste disadvantageously become stimulating. Similarly, the lactones having 9 to 11 carbon atoms have sweet smell and taste. However, when the amount of them is large, oil-like odor is generated in some cases. Use of a mixture containing the acetic acid ester and the lactone in optimum amounts at an optimum ratio can mask bitterness and provide favorable flavor.

Examples of the acetic acid esters include ethyl acetate, propyl acetate, isopropyl acetate, butyl acetate, amyl acetate, isoamyl acetate and hexyl acetate. Of these, particularly preferred are ethyl acetate, propyl acetate, isopropyl acetate, butyl acetate, each of which has 4 to 6 carbon atoms in total.

Examples of the lactones include γ-nonalactone, γ-decalactone, δ-decalactone, γ-undecalactone and δ-undecalactone. Of these, particularly preferred are γ-decalactone, δ-decalactone, γ-undecalactone and δ-undecalactone, each of which has 10 or 11 carbon atoms in total.

As to the mixture of the acetic acid ester and the lactone, particularly preferred are mixtures of (1) at least one selected from ethyl acetate, propyl acetate, isopropyl acetate and butyl acetate and (2) at least one selected from γ-decalactone, δ-decalactone, γ-undecalactone and δ-undecalactone, since these mixtures can mask bitterness, provide favorable flavor, and have no bitterness in gargling.

When B_1 denotes the mass of the acetic acid ester and B_2 denotes the mass of the lactone, the ratio B_1/B_2 (i.e., the ratio by mass (B_1/B_2)) is preferably 0.1 to 5.0. From the viewpoint of being free from bitterness in gargling, the ratio by mass thereof is more preferably 0.2 to 2.0. When the ratio by mass (B_1/B_2) is less than 0.1, oil-like odor of the lactone is felt more strongly than refreshing, sweet taste and smell of the acetic acid ester. When the ratio by mass (B_1/B_2) is more than 5.0, it may be difficult to mask bitterness due to stimulating taste and smell of the ethyl

acetate.

Notably, ingredient (B) may be perfumes formulated from a natural fragrance or a plurality of fragrances containing the acetic acid ester and the lactone.

The total amount of the acetic acid ester and the lactone (i.e., ingredient (B)), varying depending on the amount of the quaternary ammonium salt disinfectant (i.e., ingredient (A)), is 0.001% by mass to 0.5% by mass, preferably 0.01% by mass to 0.3% by mass. When the total amount thereof is less than 0.001% by mass, it is not sufficient to mask bitterness. When the total amount thereof is more than 0.5% by mass, storage stability may be poor as products.

The ratio by mass of the acetic acid ester and the lactone (i.e., ingredient (B)) to the quaternary ammonium salt disinfectant (A) (i.e., B/A) is preferably 0.04 to 2.00. From the viewpoint of being free from bitterness in gargling and providing good storage stability, the ratio by mass thereof is more preferably 0.20 to 1.20. When the ratio by mass (B/A) is less than 0.04, masking of bitterness is not sufficient in some cases. When the ratio by mass (B/A) is more than 2.00, the formed product is poor in storage stability, for example, becomes white turbid, precipitated or separated as products.

- (C) Polyhydric alcohol or sugar alcohol -

The polyhydric alcohol or the sugar alcohol (i.e., ingredient (C)) is not particularly limited and may be appropriately selected depending on the intended purpose. Examples thereof include ethylene glycol, diethylene glycol, hexylene glycol, polyethylene glycol, propylene glycol, dipropylene glycol, polypropylene glycol, isoprene glycol, glycerin, diglycerin, triglycerin, tetraglycerin, hexaglycerin, decaglycerin, 1,3-butylene glycol, trimethylpropane, erythritol, pentaerythritol, dipentaerythritol, glucose, mannose, galactose, sucrose, fructose, mannose, maltitol, xylitol, inositol, sorbitan, sorbitol and EO adducts thereof. These may be used

individually or in combination. Of these, from the viewpoints of flavor and storage stability, propylene glycol, glycerin, 1,3-butylene glycol and sorbitol are preferred, with propylene glycol being particularly preferred.

The amount of the polyhydric alcohol or the sugar alcohol is 40% by mass to 80% by mass, preferably 50% by mass to 70% by mass. When the amount thereof is less than 40% by mass, the formed liquid oral composition may become turbid. When the amount thereof is more than 80% by mass, unpleasant feelings such as bitterness may be experienced.

- Other ingredients -

Examples of the other ingredients include disinfecting agents other than ingredient (A), fragrance compositions other than ingredient (B), solvents other than ingredient (C), water-soluble pigments, antiphlogistic agents, cooling agents, essential oils containing anethole as a main ingredient, and pH adjusters. These can appropriately be incorporated into the liquid oral composition in such an amount that the effects of the present invention are not impaired.

Examples of the disinfecting agents other than ingredient (A) include isopropylmethylphenol, triclosan, trichlorocarbalinide, chlorhexidine hydrochloride, alkyldiaminoethylglycine and Octopirox.

The fragrance compositions other than ingredient (B) are mixtures containing a fragrance ingredient, a solvent for fragrances, and a fragrance stabilizer.

Fragrance materials used as the fragrance ingredient are listed in various literatures. Examples of the literatures include "Perfume and Flavor Chemicals," Vol. I and II, Steffen Arctander, Allured Pub. Co. (1994); "Synthetic Perfumes—Chemistry and Product Knowledge (*Gousei Kouryou—Kagaku to Shouhin Chishiki*)," written by Motoiti Indou, published from The Chemical Daily Co., Ltd. (1996); "Perfume and Flavor Materials of Natural Origin," Steffen

Arctander, Allured Pub. Co. (1994); "Encyclopedia of Aroma (*Kaori no Hyakka*)," edited by Japan Flavor & Fragrance Materials Association (JFFMA), published from Asakura Publishing Co., Ltd. (1989); "Perfumery Material Performance V.3.3," Boelens Aroma Chemical Information Service (1996); and "Flower oils and Floral Compounds In Perfumery," Danute Lajaujis Anonis, Allured Pub. Co. (1993). The fragrance ingredient may be appropriately selected from the fragrance materials described in these literatures. Examples thereof include eucalyptus oil, camphor, borneol, lemon oil, orange oil, lime oil, grapefruit extract, lavender oil, lavender extract, rosemary oil and rosemary extract.

Examples of the solvent for fragrances include those other than the polyhydric alcohol (i.e., ingredient (C)), such as ethanol, benzyl benzoate, acetin (triacetin), MMB acetate (3-methoxy-3-methylbutyl acetate), ethylene glycol dibutylate, dibutyl sebacate, deltyl extra (isopropyl myristate), methyl carbitol (diethylene glycol monomethyl ether), carbitol (diethylene glycol monoethyl ether), benzyl benzoate, diethyl phthalate, avolin (dimethyl phthalate), deltyl prime (isopropyl palmitate), farnesenes, dioctyl adipate, tributyrin (glyceryl tributanoate), propylene glycol diacetate, cetyl acetate (hexadecyl acetate), ethyl abietate, abalyn (methyl abietate), Citroflex A-2 (acetyltriethyl citrate), Citroflex A-4 (tributylacetyl citrate), Citroflex No. 2 (triethyl citrate), Citroflex No. 4 (tributyl citrate), Durafix (methyldihydro abietate), MITD (isotridecyl myristate) and polylimonene (limonene polymer). These may be used individually or in combination.

The amount of the fragrance composition contained in the liquid oral composition is preferably 0.005% by mass to 5% by mass, more preferably 0.01% by mass to 1% by mass.

Examples of the solvents other than ingredient (C) include C2 to C5 alcohols (e.g., ethanol, propanol and isopropanol), ester oils (e.g., triacetin) and medium chain fatty acid triglycerides (MCTs).

Examples of the antiphlogistic agents include dipotassium glycyrrhizate and sodium azulene sulfonate.

The water-soluble pigment may be selected as desired from pigments that are substantially water-soluble at ambient temperature and have high safety. Examples thereof include synthetic pigments (e.g., Blue No. 1, Blue No. 2, Blue No. 201, Blue No. 403, Green No. 3, Yellow No. 4, Yellow No. 5, Yellow No. 103, Red No. 2, Red No. 3, Red No. 104 and Red No. 106) and naturally-occurring pigments (e.g., gardenia color, carotene color, safflower color, anthocyanin and monascus color). These may be used individually or in combination. Of these, in general, synthetic pigments are suitably used, since they have a uniform quality.

The amount of the water-soluble pigment is not particularly limited and may be appropriately selected depending on the intended purpose. In general, the amount thereof can be determined in the range of 0.00005% by mass to 0.01% by mass.

Addition of the water-soluble pigment is advantageous in that the water-soluble pigment increases the identification of products (solutions) when they are transferred and diluted in a separate container, and the water-soluble pigment makes it easier to measure the solutions, and also, prevents accidental ingestion.

Examples of the cooling agents include menthol, peppermint oil, spearmint oil, mint oil, N-ethyl-p-menthane-3-carboxamide (WS3, product of Givaudan) and methyl glyceryl ether (cooling agent 10, product of Takasago International Corporation).

Examples of the essential oils containing anethole as a main ingredient include fennel oil, star anise oil and fennel oil.

Examples of the pH adjuster include citric acid and sodium citrate.

The method for producing the liquid oral composition of the present invention is not particularly limited and may be appropriately selected depending on

the intended purpose. The liquid oral composition can be produced using one or more compounds as each ingredient with a predetermined production apparatus by a routine method.

The apparatus usable for producing the liquid oral composition is not particularly limited and may be appropriately selected depending on the intended purpose. Preferred examples include agitating apparatuses having a plurality of agitating blades (e.g., propellers, turbines or disper blades) which can apply shearing force and mix entirely.

The liquid oral composition of the present invention preferably has a pH of 4.5 to 7.5, more preferably 5 to 6, particularly preferably 5.2, which is measured at 25°C with a pH meter (product of DKK-TOA CORPORATION, HM-30G) and a pH electrode (product of DKK-TOA CORPORATION, model GST-5721C). When the pH of the liquid oral composition is lower than 4.5, the stability of the system may be degraded; e.g., cetylpyridinium chloride or other compounds begin to precipitate. When the pH of the liquid oral composition is higher than 7.5, an excessive amount of the pH adjuster must be used, which is not preferred in terms of safety.

- Applications, etc. -

The liquid oral composition of the present invention is transparent, aqueous and liquid, and is rapidly and uniformly dissolved in water when diluted upon use. Thus, the liquid oral composition can be used as, for example, a gargle solution, a oral freshener or a mouth wash.

The container usable for the liquid oral composition of the present invention is those made of PET (polyethylene terephthalate), glass, polypropylene or polyethylene. Preferred are PET or glass containers from the viewpoint of avoiding adsorption of the quaternary ammonium salt disinfectant or fragrance.

Examples

The present invention will next be described by way of examples, which should not be construed as limiting the present invention thereto. Notably, in the below-described Examples and Comparative Examples, the unit "%" means "% by mass" and the amount of each ingredient is converted into the active ingredient thereof.

(Examples 1 to 31 and Comparative Examples 1 to 10)

- Preparation of liquid oral composition -

The liquid oral compositions of Examples and Comparative Examples were routinely prepared so as to have the corresponding formulations (% by mass) as shown in Tables 1 to 7. Each of the prepared liquid oral compositions was found to have a pH of 5.2.

Next, each liquid oral composition was evaluated as follows for disinfecting power, bitterness in gargling, and storage stability. The results are also shown in Tables 1 to 7.

<Evaluation of disinfecting power>

Each liquid oral composition (1 mL) was 50-fold diluted with tap water so as to have a commonly used concentration. The resultant solution was two-fold diluted with a liquid medium (Soybean-Casein-Digest Broth "DAIGO," product of NIHON PHARMACEUTICAL CO., LTD., Japanese Pharmacopoeia Test for viable bacteria count-specific microorganisms). Subsequently, one drop (0.02 mL) of Staphylococcus aureus-containing liquid was inoculated into the medium (5 mL), which was then cultured at 32°C for 72 hours. The thus-cultured medium was visually observed and judged for presence or absence of turbidity according to the following evaluation criteria.

Notably, the number of bacteria contained in the Staphylococcus aureus (ATCC6538)-containing liquid used was 1.4×10^8/mL.

Evaluation criteria:

A: Turbidity absent (infecting power effective); the medium in the right test tube in Fig. 1

B: Turbidity present (infecting power ineffective); the medium in the left test tube in Fig. 1

<Evaluation of bitterness in gargling>

Each liquid oral composition was 50-fold diluted with tap water. Ten specialized panelists gargled using the resultant aqueous solution (10 mL) for 30 sec. After spitting out, the remaining bitterness in the mouth was evaluated. The results of the sensory test were averaged and evaluated according to the following evaluation criteria.

Evaluation criteria:

5: No bitterness

4: Almost no bitterness (allowable)

3: Slight bitterness (allowable)

2: Bitterness (non-allowable)

1: Considerable bitterness (non-allowable)

Criteria for average score:

A: 4.0 or higher

B: 3.0 or higher but lower than 4.0

C: 2.0 or higher but lower than 3.0

D: lower than 2.0

<Evaluation of storage stability>

Each liquid oral composition (50 mL) was charged into a hard glass bottle and stored at 0°C for one month. Thereafter, the appearance of the liquid oral composition was observed and evaluated according to the following evaluation criteria.

Evaluation criteria:

A: Transparent (unchanged)

B: Slightly turbid (transparent, after the temperature was returned to room temperature)

C: White turbid or separated

Table 1

Ingredients (% by mass)			Examples					
			1	2	3	4	5	6
(A)	Cetylpyridinium chloride (*1)		0.25	-	0.05	0.1	0.5	1.0
	Benzalkonium chloride (*2)		-	0.25	-	-	-	-
	Benzethonium chloride (*3)		-	-	-	-	-	-
(B)	B_1	Ethyl acetate	0.03	0.03	0.03	0.03	0.03	0.03
		Amyl acetate	-	-	-	-	-	-
	B_2	γ-nonalactone	-	-	-	-	-	-
		γ-decalactone	-	-	-	-	-	-
		γ-undecalactone	0.03	0.03	0.03	0.03	0.03	0.03
(C)	Propylene glycol (*4)		60	60	60	60	60	60
	Glycerin (*5)		-	-	-	-	-	-
	Sorbitol (*6)		-	-	-	-	-	-
OIs	Dipotassium glycyrrhizate (*7)		0.25	0.25	0.25	0.25	0.25	0.25
	Menthol (*8)		0.25	0.25	0.25	0.25	0.25	0.25
	Eucalyptus oil (*9)		0.025	0.025	0.025	0.025	0.025	0.025
	Blue No. 1		0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	Yellow No. 5		0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
	Fragrance		0.1	0.1	0.1	0.1	0.1	0.1
	Saccharin sodium		0.02	0.02	0.02	0.02	0.02	0.02
	Purified water		Balance	Balance	Balance	Balance	Balance	Balance
B_1/B_2			1.0	1.0	1.0	1.0	1.0	1.0
B/A			0.24	0.24	1.20	0.60	0.12	0.06
Evaluation	Disinfecting power		A	A	A	A	A	A
	Bitterness in gargling		A	B	A	A	A	B
	Storage stability		A	A	A	A	A	A

*OIs: Optional Ingredients

Table 2

Ingredients (% by mass)			Examples					
			7	8	9	10	11	12
(A)	Cetylpyridinium chloride (*1)		0.25	0.25	0.25	0.25	0.25	0.25
	Benzalkonium chloride (*2)		-	-	-	-	-	-
	Benzethonium chloride (*3)		-	-	-	-	-	-
(B)	B_1	Ethyl acetate	-	0.03	0.03	0.0005	0.05	0.15
		Amyl acetate	0.03	-	-	-	-	-
	B_2	γ-nonalactone	-	0.03	-	-	-	-
		γ-decalactone	-	-	0.03	-	-	-
		γ-undecalactone	0.03	-	-	0.0005	0.05	0.15
(C)	Propylene glycol (*4)		60	60	60	60	60	60
	Glycerin (*5)		-	-	-	-	-	-
	Sorbitol (*6)		-	-	-	-	-	-
OIs	Dipotassium glycyrrhizate (*7)		0.25	0.25	0.25	0.25	0.25	0.25
	Menthol (*8)		0.25	0.25	0.25	0.25	0.25	0.25
	Eucalyptus oil (*9)		0.025	0.025	0.025	0.025	0.025	0.025
	Blue No. 1		0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	Yellow No. 5		0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
	Fragrance		0.1	0.1	0.1	0.1	0.1	0.1
	Saccharin sodium		0.02	0.02	0.02	0.02	0.02	0.02
	Purified water		Balance	Balance	Balance	Balance	Balance	Balance
B_1/B_2			1.0	1.0	1.0	1.0	1.0	1.0
B/A			0.24	0.24	0.24	0.004	0.40	1.20
Evaluation	Disinfecting power		A	A	A	A	A	A
	Bitterness in gargling		B	B	A	B	A	A
	Storage stability		A	A	A	A	A	A

*OIs: Optional Ingredients

Table 3

Ingredients (% by mass)			Examples					
			13	14	15	16	17	18
(A)	Cetylpyridinium chloride (*1)		0.25	0.25	0.25	0.25	0.25	0.25
	Benzalkonium chloride (*2)		-	-	-	-	-	-
	Benzethonium chloride (*3)		-	-	-	-	-	-
(B)	B_1	Ethyl acetate	0.25	0.006	0.01	0.04	0.05	0.03
		Amyl acetate	-	-	-	-	-	-
	B_2	γ-nonalactone	-	-	-	-	-	-
		γ-decalactone	-	0.054	0.05	0.02	0.01	-
		γ-undecalactone	0.25	-	-	-	-	0.03
(C)	Propylene glycol (*4)		60	60	60	60	60	40
	Glycerin (*5)		-	-	-	-	-	-
	Sorbitol (*6)		-	-	-	-	-	-
OIs	Dipotassium glycyrrhizate (*7)		0.25	0.25	0.25	0.25	0.25	0.25
	Menthol (*8)		0.25	0.25	0.25	0.25	0.25	0.25
	Eucalyptus oil (*9)		0.025	0.025	0.025	0.025	0.025	0.025
	Blue No. 1		0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	Yellow No. 5		0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
	Fragrance		0.1	0.1	0.1	0.1	0.1	0.1
	Saccharin sodium		0.02	0.02	0.02	0.02	0.02	0.02
	Purified water		Balance	Balance	Balance	Balance	Balance	Balance
B_1/B_2			1.0	0.1	0.2	2.0	5.0	1.0
B/A			2.00	0.24	0.24	0.24	0.24	0.24
Evaluation	Disinfecting power		A	A	A	A	A	A
	Bitterness in gargling		A	B	A	A	B	A
	Storage stability		B	A	A	A	A	B

*OIs: Optional Ingredients

Table 4

Ingredients (% by mass)			Examples					
			19	20	21	22	23	24
(A)	Cetylpyridinium chloride (*1)		0.25	0.25	0.25	0.25	0.25	0.25
	Benzalkonium chloride (*2)		-	-	-	-	-	-
	Benzethonium chloride (*3)		-	-	-	-	-	-
(B)	B_1	Ethyl acetate	0.03	0.03	0.03	0.03	0.03	0.03
		Amyl acetate	-	-	-	-	-	-
	B_2	γ-nonalactone	-	-	-	-	-	-
		γ-decalactone	-	-	-	-	-	-
		γ-undecalactone	0.03	0.03	0.03	0.03	0.03	0.03
(C)	Propylene glycol (*4)		80	50	70	-	-	30
	Glycerin (*5)		-	-	-	60	-	30
	Sorbitol (*6)		-	-	-	-	60	-
OIs	Dipotassium glycyrrhizate (*7)		0.25	0.25	0.25	0.25	0.25	0.25
	Menthol (*8)		0.25	0.25	0.25	0.25	0.25	0.25
	Eucalyptus oil (*9)		0.025	0.025	0.025	0.025	0.025	0.025
	Blue No. 1		0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	Yellow No. 5		0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
	Fragrance		0.1	0.1	0.1	0.1	0.1	0.1
	Saccharin sodium		0.02	0.02	0.02	0.02	0.02	0.02
	Purified water		Balance	Balance	Balance	Balance	Balance	Balance
B_1/B_2			1.0	1.0	1.0	1.0	1.0	1.0
B/A			0.24	0.24	0.24	0.24	0.24	0.24
Evaluation	Disinfecting power		A	A	A	A	A	A
	Bitterness in gargling		B	A	A	A	A	A
	Storage stability		A	A	A	B	B	A

*OIs: Optional Ingredients

Table 5

Ingredients (% by mass)			Examples						
			25	26	27	28	29	30	31
(A)	Cetylpyridinium chloride (*1)		0.25	0.25	0.25	0.25	0.25	0.25	0.1
	Benzalkonium chloride (*2)		-	-	-	-	-	-	0.1
	Benzethonium chloride (*3)		-	-	-	-	-	-	0.05
(B)	B_1	Ethyl acetate	-	-	-	-	0.01	0.01	0.01
		Amyl acetate	-	-	-	-	0.01	-	-
		Butyl acetate	0.03	-	-	-	0.01	0.02	0.02
		Propyl acetate	-	0.03	-	-	-	-	-
		Isopropyl acetate	-	-	0.03	-	-	-	-
		Isoamyl acetate	-	-	-	0.03	-	-	-
	B_2	γ-nonalactone	-	-	-	-	-	-	-
		γ-decalactone	-	-	-	-	-	0.01	0.01
		δ-decalactone	0.03	-	-	0.03	0.01	0.01	0.01
		γ-undecalactone	-	-	0.03	-	0.02	0.01	0.01
		δ- undecalactone	-	0.03	-	-	-	-	-
(C)	Propylene glycol (*4)		60	60	60	60	60	60	60
	Glycerin (*5)		-	-	-	-	-	-	-
	Sorbitol (*6)		-	-	-	-	-	-	-
OIs	Dipotassium glycyrrhizate (*7)		0.25	0.25	0.25	0.25	0.25	0.25	0.25
	Menthol (*8)		0.25	0.25	0.25	0.25	0.25	0.25	0.25
	Eucalyptus oil (*9)		0.025	0.025	0.025	0.025	0.025	0.025	0.025
	Blue No. 1		0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	Yellow No. 5		0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
	Fragrance		0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Saccharin sodium		0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Purified water		Bal-ance	Bal-ance	Bal-ance	Bal-ance	Bal-ance	Bal-ance	Bal-ance
B_1/B_2			1.0	1.0	1.0	1.0	1.0	1.0	1.0
B/A			0.24	0.24	0.24	0.24	0.24	0.24	0.24
Evalu-ation	Disinfecting power		A	A	A	A	A	A	A
	Bitterness in gargling		A	A	A	B	A	A	A
	Storage stability		A	A	A	A	A	A	A

*OIs: Optional Ingredients

Table 6

Ingredients (% by mass)			Comparative Examples				
			1	2	3	4	5
(A)	Cetylpyridinium chloride (*1)		-	0.25	0.25	0.25	0.25
	Benzalkonium chloride (*2)		-	-	-	-	-
	Benzethonium chloride (*3)		-	-	-	-	-
(B)	B_1	Ethyl acetate	0.03	0.06	-	0.0002	0.3
		Amyl acetate	-	-	-	-	-
	B_2	γ-decalactone	-	-	-	-	-
		γ-undecalactone	0.03	-	0.06	0.0002	0.3
(B')	Menthyl lactate		-	-	-	-	-
	Ethyl myristate		-	-	-	-	-
(C)	Propylene glycol (*4)		60	60	60	60	60
	Glycerin (*5)		-	-	-	-	-
	Sorbitol (*6)		-	-	-	-	-
OIs	Dipotassium glycyrrhizate (*7)		0.25	0.25	0.25	0.25	0.25
	Menthol (*8)		0.25	0.25	0.25	0.25	0.25
	Eucalyptus oil (*9)		0.025	0.025	0.025	0.025	0.025
	Blue No. 1		0.0002	0.0002	0.0002	0.0002	0.0002
	Yellow No. 5		0.0007	0.0007	0.0007	0.0007	0.0007
	Fragrance		0.1	0.1	0.1	0.1	0.1
	Saccharin sodium		0.02	0.02	0.02	0.02	0.02
	Purified water		Balance	Balance	Balance	Balance	Balance
B_1/B_2			1.0	-	0	1.0	1.0
B/A			-	0.24	0.24	0.0016	2.40
Evaluation	Disinfecting power		B	A	A	A	A
	Bitterness in gargling		A	C	C	D	C
	Storage stability		A	A	A	A	C

*OIs: Optional Ingredients

Table 7

Ingredients (% by mass)			Comparative Examples				
			6	7	8	9	10
(A)	Cetylpyridinium chloride (*1)		0.25	0.25	0.25	0.25	0.25
	Benzalkonium chloride (*2)		-	-	-	-	-
	Benzethonium chloride (*3)		-	-	-	-	-
(B)	B_1	Ethyl acetate	0.03	0.03	-	-	-
		Amyl acetate	-	-	-	-	-
	B_2	γ-decalactone	-	-	-	-	0.00005
		γ-undecalactone	0.03	0.03	-	-	-
(B')	Menthyl lactate		-	-	0.01	-	-
	Ethyl myristate		-	-	-	0.01	-
(C)	Propylene glycol (*4)		30	90	60	60	60
	Glycerin (*5)		-	-	-	-	-
	Sorbitol (*6)		-	-	-	-	-
OIs	Dipotassium glycyrrhizate (*7)		0.25	0.25	0.25	0.25	0.25
	Menthol (*8)		0.25	0.25	0.25	0.25	0.25
	Eucalyptus oil (*9)		0.025	0.025	0.025	0.025	0.025
	Blue No. 1		0.0002	0.0002	0.0002	0.0002	0.0002
	Yellow No. 5		0.0007	0.0007	0.0007	0.0007	0.0007
	Fragrance		0.1	0.1	0.1	0.1	0.1
	Saccharin sodium		0.02	0.02	0.02	0.02	0.02
	Purified water		Balance	Balance	Balance	Balance	Balance
B_1/B_2			1.0	1.0	-	-	-
B/A			0.24	0.24	0	0	0.0002
Evaluation	Disinfecting power		A	A	A	A	A
	Bitterness in gargling		C	D	D	D	D
	Storage stability		C	A	A	A	A

*OIs: Optional Ingredients

The numbers (*1) to (*9) in Tables 1 to 7 have the following meanings.

*1: product of Wako Pure Chemical Industries, Ltd.: the compound represented by General Formula (A2) where R^3 (alkyl chain) is $C_{16}H_{33}$ and Z^2 is Cl^-:cetylpyridinium chloride (Japanese Pharmaceutical Codex grade)

*2: product of NOF CORPORATION: the compound represented by General Formula (A1) where R^2 (alkyl chain) is $C_{12}H_{25}/C_{14}H_{29}$ = 63/37 (by mass) and Z^1 is Cl^-: Nissan Cation F2-50E (Japanese Pharmacopoeia)

*3: product of Matsumoto Yushi-Seiyaku Co., Ltd.: the compound represented by General Formula (A1) where R^2 is $C_{18}H_{29}O_2$ and Z^1 is Cl^-:benzethonium chloride (Japanese Pharmacopoeia grade)

*4: product of SHOWA DENKO K.K.: PG-P (Japanese Pharmacopoeia)

*5: product of New Japan Chemical Co., Ltd.: glycerin (Japanese Pharmacopoeia)

*6: product of ADEKA CORPORATION: sorbitol (Japanese Pharmacopoeia)

*7: product of MARUZEN PHARMACEUTICALS CO., LTD.: dipotassium glycyrrhizate (Japanese Pharmaceutical Codex)

*8: product of Takasago International Corporation: l- menthol (Japanese Pharmacopoeia)

*9: product of Nippon Terpene Chemicals, Inc.: eucalyptus oil (the 15th revised Japanese Pharmacopoeia)

(Example 32)

- Mouth wash -

A liquid oral composition was routinely prepared so as to have the formulation as shown in Table 8, and was evaluated in the same manner as performed above. The results are shown in Table 8.

Table 8

Example 32		
Cetylpyridinium chloride (*1)		0.25% by mass
Ethyl acetate		0.02% by mass
Amyl acetate		0.02% by mass
γ-decalactone		0.02% by mass
γ-undecalactone		0.02% by mass
γ-nonalactone		0.02% by mass
Clove oil		0.001% by mass
Fennel oil		0.001% by mass
Propylene glycol (*4)		60% by mass
Dipotassium glycyrrhizate (*7)		0.25% by mass
Menthol (*8)		0.25% by mass
Saccharin sodium		0.02% by mass
Eucalyptus oil (*9)		0.025% by mass
Yellow No. 5		0.0005% by mass
Red No. 106		0.0001% by mass
Fragrance		0.08% by mass
Purified water		Balance
B_1/B_2		0.67
B/A		0.40
Evaluation	Disinfecting power	A
	Bitterness in gargling	A
	Storage stability	A

In Table 8, the numbers (*1), (*4), (*7), (*8) and (*9) have the same meanings as described above.

Industrial Applicability

The liquid oral composition of the present invention has remarkably suppressed bitterness and stimulation (i.e., improved tastes), high convenience and excellent storage stability, although it incorporates a quaternary ammonium salt disinfectant such as cetylpyridinium chloride. Thus, the liquid oral composition is suitably used for a gargle, an oral freshener, a mouth wash, etc.

Brief Description of Drawings

Fig. 1 is a photograph depicting the presence or absence of turbidity in the evaluation for disinfecting power in Examples.

CLAIMS

1. A liquid oral composition comprising:

(A) a quaternary ammonium salt disinfectant,

(B) an acetic acid ester and a lactone in a total amount of 0.001% by mass to 0.5% by mass, and

(C) at least one selected from a polyhydric alcohol and a sugar alcohol in an amount of 40% by mass to 80% by mass.

2. The liquid oral composition according to claim 1, wherein the acetic acid ester is ethyl acetate, butyl acetate, propyl acetate, isopropyl acetate, amyl acetate or isoamyl acetate, and the lactone is γ-nonalactone, γ-decalactone, δ-decalactone, γ-undecalactone or δ-undecalactone.

3. The liquid oral composition according to one of claims 1 and 2, wherein the ratio B_1/B_2 is 0.1 to 5.0, where B_1 denotes the mass of the acetic acid ester and B_2 denotes the mass of the lactone.

4. The liquid oral composition according to any one of claims 1 to 3, wherein the ratio B/A is 0.04 to 2.00, where B denotes the total mass of the acetic acid ester and the lactone, and A denotes the mass of the quaternary ammonium salt disinfectant.