

DESCRIPTION

TITLE OF INVENTION

ORAL COMPOSITION

5

TECHNICAL FIELD

[0001]

10 The present invention relates to an oral composition effective for the suppression or prevention of hypersensitivity, which composition minimizes irritation by water-soluble aluminum salts and imparts a high feeling of astringency.

BACKGROUND ART

15 [0002]

 Various types of active ingredients, such as anti-inflammatory ingredients and bactericidal ingredients, are included in oral compositions in order to suppress or prevent symptoms of periodontal disease such as inflammation of the gums. To encourage continued daily use and thus enhance the effects thereof, it is important to give the user the feeling of satisfaction gained by having him or her experience a sense of effectiveness, such as a tightening sensation in the gums. However this by itself is not always enough at present. For example, anti-inflammatory ingredients such as tranexamic acid and dipotassium glycyrrhizate exhibit excellent gum inflammation-suppressing effects. Yet, with these ingredients, the astringency associated with a gum tightening sensation is inadequate.

25 [0003]

 Water-soluble aluminum compounds such as aluminum lactate which have a dentinal tubule occluding action are commonly used for alleviating or preventing dentin hypersensitivity symptoms that arise due to the formation of periodontal pockets and dentin exposure accompanying the progression of periodontal disease. The astringency of aluminum ions was expected to provide some degree of gum tightening sensation, but this has not been enough. On the other hand, when too much is added to an oral composition, the irritation and bitterness due to the aluminum ions intensify, resulting in an unpleasant sensation.

30

Because of this, and given also that symptomatic individuals with inflammation of the gums in particular are sensitive to irritation, there has existed a desire to suppress irritation due to water-soluble aluminum salts and impart a high feeling of astringency.

[0004]

5 In Patent Document 1 (JP No. 6441669), the binder hydroxyethyl cellulose is included and used in a specific amount and ratio together with, as an astringent ingredient, a water-soluble aluminum salt in a liquid oral composition having a water-soluble aluminum salt content of 0.5 wt% or less, thereby suppressing harmful effects such as irritation and imparting a high gum tightening sensation. However, the gum tightening sensation is
10 inadequate and there is a concern that including excessive water-soluble aluminum salt will cause irritation.

 Patent Document 2 (JP-A S61-155314) discloses that, by including a hydroxyalkyl cellulose and carrageenan as binders in an oral composition formulated with a soluble aluminum compound such as aluminum lactate, the stability and the slimy feeling on use
15 are improved. Patent Document 3 (JP-A 2000-178150) discloses that by including sodium carboxymethylcellulose in a liquid oral composition containing aluminum lactate and a nonionic surfactant, the cleansing strength improves and irritation of the oral mucosa is suppressed. However, these disclosures are not focused on, nor do they make any mention of, imparting a feeling of astringency.

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PRIOR ART DOCUMENTS

PATENT DOCUMENTS

[0005]

Patent Document 1: JP No. 6441669

25 Patent Document 2: JP-A S61-155314

Patent Document 3: JP-A 2000-178150

Patent Document 4: JP No. 5440150

Patent Document 5: WO 2006/068011

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0006]

The present invention was arrived at in light of the above circumstances. The object
5 of this invention is to provide an oral composition which is capable of suppressing irritation
due to water-soluble aluminum salts and imparting a high feeling of astringency.

SOLUTION TO PROBLEM

[0007]

10 The inventors have conducted intensive investigations in order to achieve the above
objects and discovered as a result that when an oral composition containing, as a
hypersensitivity suppressing or preventing ingredient, (A) a water-soluble aluminum salt in
a specific amount in terms of the aluminum ions, is also formulated with (B) a cationic
polymer compound such that the weight ratio of the content of component (A) in terms of
15 aluminum ions to the content of component (B), expressed as (amount of aluminum ions in
component (A))/(B), falls within a specific range, irritation due to component (A) is
suppressed and a high feeling of astringency can be imparted. That is, in this invention,
by including (B) a cationic polymer compound together with (A) a water-soluble aluminum
salt and by setting the component (A) content in terms of aluminum ions at from 0.1 to
20 0.5 wt% and setting the weight ratio expressed as (amount of aluminum ions in component
(A))/(B) within the range of 0.23 to 5, there can be provided an oral composition effective
for suppressing or preventing hypersensitivity, which composition suppresses irritation due
to component (A) and is able to impart a suitably high feeling of astringency to the gums,
etc. without subjecting the user to an unpleasant irritating sensation within the mouth. This
25 discovery ultimately led to the present invention.

[0008]

In this invention, when the amount of aluminum ions in component (A) and the
weight ratio (amount of aluminum ions in component (A))/(B) fall within specific respective
ranges, the combination of components (A) and (B) is able to impart the outstanding
30 working effects mentioned above.

That is, even when component (A) is included in the oral composition in an amount,
expressed in terms of the aluminum ions, of 0.1 wt% or more, the feeling of astringency

cannot be regarded as sufficient; indeed, as the amount of component (A) included increases, this leads to an irritating sensation due to the aluminum ions. Moreover, component (B) itself is a substance having weak astringency. Yet, in this invention, surprising as it may seem, the astringency of component (A) is intensified by component (B), enabling a high
5 feeling of astringency to be imparted. Here, as the amount of component (B) added rises, irritation due to the aluminum ions in component (A) becomes increasingly experienced as an unpleasant irritating sensation. However, when the weight ratio (amount of aluminum ions in component (A))/(B) falls within a specific range, a high feeling of astringency can be conferred without imparting an unpleasant irritating sensation.

10 As is also apparent from the results for the subsequently described Comparative Examples in Table I-1, when component (B) was not included, even with the inclusion of hydroxyethyl cellulose together with component (A), the gum tightening sensation was low (Comparative Examples 2 and 3). Also, even in cases where components (A) and (B) were both included, when the amount of aluminum ions in component (A) was too low, the gum
15 tightening sensation was low (Comparative Example 5); and when it was too high, the irritating sensation within the mouth worsened (Comparative Example 4). Even when the amount of aluminum ions in component (A) fell within the specific indicated range, when the weight ratio (amount of aluminum ions in component (A))/(B) was unsuitable, the feeling of astringency by the gums was low or the irritating sensation within the mouth was poor
20 (Comparative Examples 6 and 7). By contrast, the oral compositions in the subsequently described Examples according to the invention in Tables I-2 and I-3, wherein components (A) and (B) of the invention were included and both the amount of aluminum ions in component (A) and the weight ratio (the amount of aluminum ions in (A))/(B) fell within specific respective ranges, had a hypersensitivity-suppressing effect and a high feeling of
25 astringency by the gums. In addition, the irritating sensation within the mouth was low, with substantially no unpleasant irritation being sensed.

Patent Document 4 (JP No. 5440150) describes an improvement in the fluoride deposition-promoting effect on tooth surfaces of an oral composition containing both aluminum lactate in an amount of 1.0 wt% or less (in terms of aluminum ions, an amount
30 of less than 0.1 wt%) and also sodium fluoride by including therein a cationized cellulose. Patent Document 5 (WO 2006/068011) describes tooth whitening via the use of aluminum oxide as a whitening powder and the joint use therewith of pullulan and cationized cellulose.

By contrast, what the present invention does is to provide an enhancement in the astringent sensation-imparting effect in oral compositions by combining component (B) in a specific ratio with component (A).

[0009]

5 By additionally including (E) xanthan gum, the oral composition of the invention can also be imparted with excellent ribbon formability and excellent dischargeability from a container. In this case, by including component (E) in especially a dentifrice composition, the composition is easy to place on a toothbrush and has excellent ribbon formability. In addition, by using component (E) and component (A) together, the hardening of the
10 composition (dentifrice composition) that arises over time is prevented and the composition is easily discharged from a container even after storage and thus has excellent dischargeability from a container. Moreover, when the composition contains a relatively small amount of abrasive and is thus mild, on top of being outstanding in terms of both above properties and also mild and pleasant to brush with, the composition can be imparted with effects such as
15 hypersensitivity suppression due to component (A).

When component (A) is included in a dentifrice composition and component (E) is included as a binder so as to make it easier to place the composition on a toothbrush, particularly when the abrasive content is lowered to, for example, 15 wt% or less, a problem peculiar to component (E) arises. Namely, as the content of component (E) increases,
20 component (A) adsorbs to component (E) over time, giving rise to gelation and hardening, causing the composition to become harder and worsening dischargeability from a tube or other type of container after storage. This makes it impossible to ensure dischargeability from the container and impart a suitable ribbon formability that allows the composition to be easily placed on a toothbrush. However, when component (B) is combined and included
25 together with component (E), depending on the particular component (B) used, hardening of the composition over time due to components (A) and (E) is prevented and the above problem is resolved, thus conferring both excellent ribbon formability that allows the composition to be easily placed on a toothbrush and also excellent dischargeability that enables the composition to be easily discharged from a container even after storage (see the
30 subsequently described Examples in Tables II-2 to II-4).

[0010]

The oral composition of the invention may further include (F) one or more selected from the group consisting of silica, calcium carbonate and calcium phosphate. In this invention, even when component (F) is included as an abrasive, owing to the fact that component (B) is included, the dentinal tubule occluding effect due to component (A) increases, enabling an excellent dentinal tubule occluding effect that is both immediate and also stable after storage to be imparted.

More specifically, in oral compositions, in order to elicit a dentinal tubule occluding effect due to a water-soluble aluminum compound such as aluminum lactate and thereby prevent or suppress hypersensitivity, it is important for the compound to be present as free aluminum ions. Yet, it has been found that, even when the amount of water-soluble aluminum compound added is increased, the immediacy of the effect is not improved and also that the effect following storage decreases. It has been shown that one cause of this is that the free aluminum ions adsorb to the abrasive within the formulated ingredients.

Moreover, it turns out that aluminum ions adsorb more easily to component (F) than to other types of abrasives. However, in the oral composition of this invention, surprisingly, owing to the presence of component (B), the aluminum ions from component (A) do not adsorb to component (F) and so their dentinal tubule occluding action increases and rapidly emerges. As a result, the immediacy of the dentinal tubule occluding effect rises, enabling a high dentinal tubule occluding effect to be imparted even when the composition is used a relatively small number of times, and this effect can be stably maintained even after storage. Furthermore, a good-tasting feeling on use can be imparted (see the subsequently described Examples in Tables III-1 and III-2).

[0011]

Accordingly, the invention provides the following oral composition.

[1]

An oral composition which includes:

(A) a water-soluble aluminum salt, and

(B) a cationic polymer compound,

wherein the content of component (A) in terms of aluminum ions is from 0.1 to 0.5 wt% and the weight ratio expressed as (amount of aluminum ions in component (A))/(B) is from 0.23 to 5.

[2]

The oral composition of [1], wherein the water-soluble aluminum salt (A) is one or more selected from the group consisting of aluminum lactate, aluminum potassium sulfate, aluminum chloride, aluminum nitrate and aluminum sulfate.

5 [3]

The oral composition of [1] or [2], wherein the cationic polymer compound (B) is one or more selected from cationized cellulose and cationized guar gum.

[4]

The oral composition of any of [1] to [3], wherein the weight ratio expressed as
10 (amount of aluminum ions in component (A))/(B) is from 0.3 to 3.1.

[5]

The oral composition of any of [1] to [4], wherein the content of component (B) is from 0.03 to 2 wt%.

[6]

15 The oral composition of any of [1] to [5], further including (C) from 0.2 to 5 wt% of one or more selected from (C-1) nonionic surfactants and (C-2) betaine-type amphoteric surfactants.

[7]

The oral composition of [6], wherein the nonionic surfactant (C-1) is selected from
20 the group consisting of polyoxyethylene hydrogenated castor oils having an average number of moles of added ethylene oxide of from 5 to 100 and polyoxyethylene alkyl ethers having an alkyl group of 10 to 18 carbon atoms and an average number of moles of added ethylene oxide of from 5 to 40, and the betaine-type amphoteric surfactant (C-2) is a fatty acid amidopropyl betaine having an alkyl group of 10 to 16 carbon atoms.

25 [8]

The oral composition of any of [1] to [7], further including (D) from 0.01 to 5 wt% of an anti-inflammatory ingredient.

[9]

The oral composition of any of [1] to [8], further including (E) xanthan gum.

30 [10]

The oral composition of [9], wherein the content of component (E) is from 0.1 to 3 wt%.

[11]

The oral composition of [9] or [10], wherein the weight ratio (B)/(E) is 0.01 or more.

[12]

5 The oral composition of any of [1] to [11], further including (F) one or more selected from the group consisting of silica, calcium carbonate and calcium phosphate.

[13]

The oral composition of [12], wherein the content of component (F) is from 3 to 30 wt%.

[14]

10 The oral composition of [12] or [13], further including (G) a water-soluble fluorine compound.

[15]

The oral composition of [14], wherein the water-soluble fluorine compound (G) is sodium monofluorophosphate and the content thereof is from 0.1 to 5 wt%.

15 [16]

The oral composition of any of [1] to [15] which is a toothpaste composition.

[17]

The oral composition of any of [1] to [16] which is for use in suppressing or preventing hypersensitivity.

20

ADVANTAGEOUS EFFECTS OF INVENTION

[0012]

By virtue of this invention, there can be provided oral compositions effective for suppressing or preventing hypersensitivity, which compositions suppress irritation by
25 component (A) and impart a high feeling of astringency without causing the user to feel unpleasant irritation within the mouth. The oral compositions of the invention, together with having a hypersensitivity suppressing or preventing effect, impart a higher feeling of astringency than conventional oral compositions and thus are able to confer a sense of effectiveness that is highly satisfactory. They are also effective when used by individuals
30 with hypersensitivity who are sensitive to irritation associated with, for example, inflammation of the gums.

In cases where the oral composition of the invention further includes component (E), it can be rendered into a product which has excellent ribbon formability and which, even after storage, has excellent dischargeability from a container. When the oral composition of the invention further includes component (F), depending on the particular component (A) used, a dentinal tubule occluding effect that is instantaneous and also of excellent stability even after storage is imparted and a good taste can be achieved.

DESCRIPTION OF EMBODIMENTS

[0013]

10 The invention is described more fully below. The oral composition of the invention includes (A) a water-soluble aluminum salt and (B) a cationic polymer compound.

[0014]

The water-soluble aluminum salt (A) has a hypersensitivity suppressing or preventing effect due to a dentinal tubule occluding action, and also imparts a feeling of astringency.

15 Examples of the water-soluble aluminum salt include aluminum lactate, aluminum potassium sulfate, aluminum chloride, aluminum nitrate and aluminum sulfate. One of these may be used alone or two or more may be used together. Of these, particularly from the standpoint of imparting a feeling of astringency and suppressing irritation, aluminum lactate and aluminum potassium sulfate are preferred, and aluminum lactate is more preferred.

20 Commercial products may be used as these ingredients.

[0015]

The content of the water-soluble aluminum salt (A), in terms of aluminum ions, is from 0.1 to 0.5% (here and below, “%” stands for percent by weight) of the overall composition, especially from 0.10 to 0.50%, preferably from 0.11 to 0.46%, more preferably from 0.14 to 0.37%, and even more preferably from 0.18 to 0.31%. At a content below 0.1%, the feeling of astringency is inferior. The higher the content, the stronger the irritation; at a content above 0.5%, the irritating sensation cannot be suppressed.

In cases where, for example, aluminum lactate is used as component (A), the content thereof is preferably from 1.1 to 5.5% of the overall composition, more preferably from 1.2 to 5%, even more preferably from 1.5 to 4%, and still more preferably from 2 to 3.3%.

[0016]

The cationic polymer compound (B) acts to intensify the feeling of astringency due to component (A).

Examples of the cationic polymer compound (B) include cationized cellulose, dimethyldiallylammonium homopolymers, copolymers of dimethyldiallylammonium chloride and polymerizable monomers having an ethylenically unsaturated hydrocarbon group, cationized polyvinylpyrrolidone, cationized polyamide, cationized polymethacrylate, cationized polyacrylamide, copolymers of cationized methacrylate and acrylamide, copolymers of cationized methacrylate and methacrylate, polyethyleneimide, cationized starch, cationized amylose, cationized guar gum, cationized locust bean gum, cationized agar, chitin, chitosan, and modified forms thereof. The nitrogen content is preferably from 0.1 to 3%. These may be used singly or two or more may be used in combination. Of the above, from the standpoint of intensifying the feeling of astringency, cationized cellulose and cationized guar gum are preferred. From the standpoint in particular of suppressing an irritating sensation, cationized cellulose is more preferred.

[0017]

Examples of cationized celluloses include hydroxyethyl cellulose dimethyldiallylammonium chloride and other hydroxyethyl cellulose dimethyldiallylammonium salts obtained by graft polymerizing a dimethyldiallylammonium salt onto hydroxyethyl cellulose, and O-[2-hydroxy-3-(trimethylammonio)propyl] hydroxyethyl cellulose chloride obtained by bonding 2,3-epoxypropyltrimethylammonium chloride to hydroxyethyl cellulose. Of these, hydroxyethyl cellulose dimethyldiallylammonium salts are preferred.

An example of a cationized guar gum is O-[2-hydroxy-3-(trimethylammonio)propyl] guar gum chloride.

[0018]

Also, particularly in cases where the subsequently described component (E) is included, the cationic polymer compound is preferably one having a nitrogen content of from 0.1 to 3%, and more preferably one having a nitrogen content of from 0.5 to 2.5%.

From the standpoint of the dischargeability of the composition from a container after storage, it is preferable for the cationic polymer compound to have a weight-average molecular weight, as determined by gel permeation chromatography (GPC)

using polyethylene glycol as the reference material (the same applies below), of from 250,000 to 1,500,000.

The cationic polymer compound has a viscosity, as a 2% aqueous solution at 21°C, which is preferably from 30 to 3,000 mPa·s, and more preferably from 35 to 350 mPa·s.

5 Here and below, the viscosity of a 2% aqueous solution of the cationic polymer compound was measured at 21°C using a BH-type Brookfield viscometer (No. 2 rotor; 20 rotations; measurement time, 1 minute).

[0019]

A commercial product may be used as the cationic polymer compound. Specific
10 examples of hydroxyethyl cellulose dimethyldiallylammonium chloride include Celquat L-200 and Celquat H-100 from AkzoNobel K.K., and also Celquat L-200 from Nippon NSC K.K. An example of O-[2-hydroxy-3-(trimethylammonio)propyl] hydroxyethyl cellulose chloride is Leogard MGP from Lion Corporation. An example of
O-[2-hydroxy-3-(trimethylammonio)propyl] guar gum chloride is Jaguar C-17 from
15 Sansho Co., Ltd. As for hydroxyethyl cellulose dimethyldiallylammonium salts, it is also possible to use Celquat L-200 (from Nippon NSC K.K.; weight-average molecular weight, 250,000 to 350,000; viscosity of 2% aqueous solution at 21°C, 35 to 350 mPa·s).

[0020]

The content of the cationic polymer compound (B) is preferably from 0.03 to 2%
20 of the overall composition, more preferably from 0.05 to 1%, and even more preferably from 0.1 to 0.7%. At a content of 0.03% or more, a sufficient feeling of astringency can be obtained. Not including too much component (B) is preferable for suppressing an unpleasant irritating sensation; at a content of 2% or less, the irritating sensation is sufficiently suppressed.

25 [0021]

In this invention, the weight ratio between the content of component (A) in terms of aluminum ions and the content of component (B), expressed as (amount of aluminum ions in component (A))/(B), is from 0.23 to 5, preferably from 0.23 to 4.6, more preferably from 0.3 to 4, even more preferably from 0.3 to 3.1, and still more preferably from 0.3 to 2.1.
30 When the weight ratio (amount of aluminum ions in component (A))/(B) falls within the above range, an increase in the feeling of astringency and suppression of the irritating sensation are both achieved. However, when the weight ratio exceeds 5, the feeling of

astringency is inferior; when the weight ratio is less than 0.23, the irritating sensation becomes stronger.

[0022]

5 In this invention, it is preferable to further include (C) one or more selected from (C-1) nonionic surfactants and (C-2) betaine-type amphoteric surfactants. When component (C) is included in addition to components (A) and (B), an irritating sensation can be better suppressed. In this case, it suffices to include component (C-1) or component (C-2), although both components (C-1) and (C-2) may be included.

[0023]

10 Examples of the nonionic surfactant (C-1) include polyoxyethylene hydrogenated castor oil, polyoxyethylene alkyl ethers, sucrose fatty acid esters, alkyl glycosides, polyoxyethylene-polyoxypropylene block copolymers, polyoxyethylene ethers of glycerol esters, fatty acid alkylolamides and glycerol fatty acid esters. Of these, from the standpoint of suppressing an irritating sensation, polyoxyethylene hydrogenated castor oil and
15 polyoxyethylene alkyl ethers are preferred.

The polyoxyethylene hydrogenated castor oil is preferably one in which the average number of moles of added ethylene oxide is from 5 to 100. The polyoxyethylene alkyl ether is preferably one having an alkyl group of 10 to 18 carbon atoms and in which the average number of moles of added ethylene oxide is from 5 to 40.

20 The betaine-type amphoteric surfactant (C-2) is preferably one having an alkyl group of 10 to 16 carbon atoms, examples of which include fatty acid amidopropyl betaines, alkyl acetic acid betaines and alkyl imidazolinium betaines having this number of carbon atoms. Of these, from the standpoint of suppressing an irritating sensation, the use of fatty acid amidopropyl betaines, especially cocamidopropyl betaine, is preferred.

25 [0024]

The content of component (C) is preferably from 0.2 to 5% of the overall composition, more preferably from 0.5 to 4%, and even more preferably from 1 to 3%. When included in this range, an irritating sensation can be better suppressed and a feeling of astringency can be fully ensured.

[0025]

In addition to component (C), anionic surfactants and cationic surfactants may be added as other optional surfactants within ranges that do not detract from the advantageous effects of the invention.

5 Examples of anionic surfactants include alkyl sulfates such as sodium lauryl sulfate, acyl sarcosinates, acyl taurates such as sodium lauroyl methyl taurate, and acylamino acid salts.

 Examples of cationic surfactants include alkylammonium type and alkylbenzylammonium salts.

10 The content of these optional surfactants is preferably from 0.2 to 4%, and more preferably from 0.5 to 2%, of the overall composition. In particular, the content of anionic surfactants which may cause irritation, especially alkyl sulfates such as sodium lauryl sulfate, is preferably not more than 3% of the overall composition, more preferably not more than 2%, and may even be 0%--meaning that they are not included.

15 [0026]

 The oral composition of the invention preferably further includes as an effective ingredient: (D) an anti-inflammatory ingredient. By including an anti-inflammatory ingredient (D), the anti-inflammatory effect prevents gum recession which is a cause of hypersensitivity and also can increase the sense of effectiveness.

20 [0027]

 Examples of the anti-inflammatory ingredient (D) include tranexamic acid, ϵ -aminocaproic acid, glycyrrhizic acid and salts thereof, glycyrrhetinic acid, azulesulfonic acid and salts thereof, and lysozyme and salts thereof. Of these, in terms of the onset of the advantageous effects of the invention, tranexamic acid, ϵ -aminocaproic acid, 25 glycyrrhizic acid and salts thereof and glycyrrhetinic acid are preferred; tranexamic acid is especially preferred.

 The content of the anti-inflammatory ingredient (D) is preferably from 0.01 to 5%, and more preferably from 0.05 to 1%, of the overall composition. Within this range, a sufficient anti-inflammatory effect can be obtained, and the sense of effectiveness is further 30 enhanced.

[0028]

Aside from the above, where necessary, other known pharmaceutically effective ingredients may be added as active ingredients. Examples of optional effective ingredients include nonionic bactericides such as isopropylmethylphenol, cationic bactericides such as cetyl pyridinium chloride, enzymes such as dextranase, inorganic salts such as water-soluble phosphate compounds, sodium chloride and potassium nitrate, vitamins such as ascorbic acid and tocopheryl acetate, plant extracts, anti-tartar agents and anti-plaque agents. These optional ingredients may be included in effective amounts within ranges that do not detract from the advantageous effects of the invention.

[0029]

The oral composition of the invention preferably further includes (E) xanthan gum. By including xanthan gum (E), particularly in the case of dentifrice compositions, the composition is easy to place on a toothbrush and has an excellent ribbon formability. Moreover, by using components (E) and (A) together, the hardening of the composition (dentifrice composition) that arises over time is prevented, allowing the composition to be easily discharged from a container even after storage and thus giving it excellent dischargeability, enabling the composition to be endowed with both excellent ribbon formability and excellent dischargeability from a container. Also, by having the amount of abrasive be relatively small and thus making the formulation mild, on top of the composition being mild and very pleasant to brush with, advantageous effects such as the suppression of hypersensitivity due to component (A) can be imparted.

[0030]

Xanthan gum (E) acts to maintain a suitable ribbon formability and improve the ease of placing the composition on a toothbrush.

The xanthan gum used may be a commercial product, such as Monat Gum DA (from DSP Gokyo Food & Chemical Co., Ltd.).

The xanthan gum (E) content is preferably from 0.1 to 3%, more preferably from 0.5 to 1.5%, and even more preferably from 0.6 to 1.5%, of the overall composition. At a content of 0.1% or more, the ribbon formability of the preparation of the preparation is suitably maintained and the ease of placing the composition on a toothbrush is sufficiently improved. When the content of component (E) is too high, the stringiness of the composition may worsen or the preparation may become too hard, lowering the ease of use.

[0031]

The weight ratio of component (B) to component (E), expressed as (B)/(E), is preferably at least 0.01, more preferably at least 0.06, and even more preferably at least 0.1, but is preferably not more than 10, more preferably not more than 4, and even more preferably not more than 2. At a weight ratio (B)/(E) within this range, the ease of placing the composition on a toothbrush and the dischargeability of the composition from a container following storage are further improved.

[0032]

It is preferable for the oral composition of the invention to additionally include (F) one or more selected from the group consisting of silica, calcium carbonate and calcium phosphate. In this invention, even when component (F) is included as an abrasive, depending on the particular component (A) used, a dentinal tubule occluding effect of excellent immediacy and also excellent stability following storage can be imparted.

[0033]

Component (F) is one, two or more selected from the group consisting of silica, calcium carbonate and calcium phosphate, all of which are abrasives.

The silica is exemplified by silica (silicic anhydride)-containing abrasives, including silica-type abrasives such as silica gel, precipitated silica, zirconosilicate and aluminosilicate. So long as they include silica, metal complex silicas which additionally contain a metal such as aluminum or zirconium are also acceptable and may be used. In component (F) according to this invention, "silica" refers to a silica (silicic anhydride)-containing abrasive.

Examples of calcium carbonates include calcium carbonate-type abrasives such as precipitated calcium carbonate and ground calcium carbonate, any of which may be used.

Examples of calcium phosphates include calcium phosphate-type abrasives such as dicalcium phosphate dihydrate, dicalcium phosphate anhydrate and calcium pyrophosphate, any of which may be used.

These may be used singly or two or more may be used in combination. Commercial products may be used as these.

From the standpoint of the immediacy of the dentinal tubule occluding effect, silica-type abrasives and calcium carbonate-type abrasives are preferred. In terms of the immediacy of the dentinal tubule occluding effect and the dentinal tubule occluding effect following repeated use, silica-type abrasives are especially preferred.

[0034]

The component (F) content is preferably not more than 30%, more preferably not more than 25%, and even more preferably not more than 15%, of the overall composition. Although there is no particular lower limit value, from the standpoint of the cleansing sensation, the component (F) content is preferably at least 3%, and more preferably at least 5%. When too much is included, the dentinal tubule occluding effect, particularly the immediacy of the effect following storage, may decrease; at a content of 30% or less, the immediacy and stability of the dentinal tubule occluding effect are fully satisfactory.

The content of component (F) serving as an abrasive, particularly when the aim is to achieve mildness and excellent brushing comfort, is preferably not more than 15% of the overall composition, more preferably not more than 12%, and even more preferably not more than 10%. Even at such a content, when component (E) is included, an excellent ribbon formability and excellent dischargeability from a container can both be achieved.

[0035]

In this invention, particularly in cases where component (F) is included, it is preferable to include also (G) a water-soluble fluorine compound. When component (G) is used together with component (B), it acts to increase the improvement in the dentinal tubule occluding effect due to component (B), further enhancing the immediacy and stability of this effect, particularly the immediacy of the dentinal tubule occluding effect after storage.

Examples of the water-soluble fluorine compound include sodium monofluorophosphate, sodium fluoride, potassium fluoride, ammonium fluoride, tin fluoride, amine fluoride, potassium monofluorophosphate and sodium fluorosilicate. Sodium monofluorophosphate and sodium fluoride are preferred; sodium monofluorophosphate is especially preferred.

[0036]

The component (G) content is adjusted in accordance with the substance used. When sodium monofluorophosphate is used as component (G), the content thereof is preferably from 0.1 to 5% of the overall composition, more preferably from 0.5 to 3%, and even more preferably from 1 to 2%.

When sodium fluoride is included as component (G), the content thereof is preferably from 0.05 to 3%, and more preferably from 0.1 to 1%, of the overall composition.

When the component (G) content falls within the above range, the dentinal tubule occluding effect rises to a sufficient degree, in addition to which a puckery or bitter taste is sufficiently suppressed, enabling a good-tasting feeling on use to be maintained.

[0037]

5 The oral composition of the invention is suitable as, in particular, a dentifrice composition such as a toothpaste. In addition to the above ingredients, where necessary, other known ingredients may be included within ranges that do not detract from the advantageous effects of the invention. For example, binders, humectants, sweeteners, preservatives, colorants, flavors and pH adjustors may be included in a toothpaste
10 composition. These may be included in typical amounts within ranges that do not detract from the advantageous effects of the invention.

[0038]

 An organic binder or inorganic binder other than component (B) and component (E) may be included as an optional binder. Specific examples of organic binders include the
15 cellulose derivatives such as sodium carboxymethylcellulose, methyl cellulose and hydroxymethyl cellulose, and also alginic acid derivatives, carrageenan, polyvinyl alcohol and sodium polyacrylate. Specific examples of inorganic binders include thickening silica and thickening aluminum silica. The content of these binders is typically from 0.1 to 10%, and especially from 0.5 to 5%, of the overall composition. In this invention, from the
20 standpoint of the appearance of advantageous effects, an organic binder is especially preferred. The organic binder content is typically from 0.1 to 5%, and especially from 0.5 to 3%, of the overall composition. Because component (B) and also component (E) also act as binders, the content of binders other than these (i.e., optional binders) may be 2% or less, especially 1% or less, of the overall composition.

25 [0039]

 Examples of humectants include sugar alcohols such as sorbitol and xylitol, and polyhydric alcohols such as glycerin and propylene glycol. The humectant content is typically from 5 to 50%, especially from 20 to 45%, of the overall composition.

[0040]

30 An example of a sweetener is sodium saccharin.

 Examples of preservatives include p-hydroxybenzoate esters, benzoic acid and salts thereof.

Examples of colorants include Blue No. 1, Yellow No. 4 and titanium dioxide.

[0041]

Examples of flavors include natural flavors such as peppermint oil, spearmint oil, anise oil, eucalyptus oil, wintergreen oil, cassia oil, clove oil, thyme oil, sage oil, lemon oil, orange oil, Japanese mint oil, cardamom oil, coriander oil, mandarin oil, lime oil, lavender oil, rosemary oil, laurel oil, chamomile oil, caraway oil, marjoram oil, bay oil, lemongrass oil, organum oil, pine needle oil, neroli oil, rose oil, jasmine oil, grapefruit oil, sweetie oil, yuzu oil, iris concrete, absolute peppermint, absolute rose and orange flower; flavors obtained by the processing and treatment (head cut, tail cut, fractional distillation, liquid-liquid extraction, essence preparation, powdered flavor preparation, etc.) of these natural flavors; single flavors such as menthol, carvone, anethole, cineole, methyl salicylate, cinnamic aldehyde, eugenol, 3-L-menthoxypropane-1,2-diol, thymol, linalool, linalyl acetate, limonene, menthone, menthyl acetate, N-substituted p-menthane-3-carboxamide, pinene, octyl aldehyde, citral, pulegone, carvyl acetate, anise aldehyde, ethyl acetate, ethyl butyrate, allyl cyclohexane propionate, methyl anthranilate, ethyl methylphenylglycidate, vanillin, undecalactone, hexanal, butanol, isoamyl alcohol, hexenol, dimethyl sulfide, cyclotene, furfural, trimethylpyrazine, ethyl lactate and ethyl thioacetate; and blended flavors such as strawberry flavor, apple flavor, banana flavor, pineapple flavor, grape flavor, mango flavor, butter flavor, milk flavor, fruit mix flavor and tropical fruit flavor. These flavors and other known flavor ingredients suitable for oral compositions may be used in combination.

The flavor content is not particularly limited, although the above flavor ingredients are preferably used in an amount of from 0.000001 to 1% within the composition. Perfume flavors using the above flavor ingredients are preferably included within the composition in an amount of from 0.1 to 2%.

[0042]

A pH adjustor may be added. Examples include alkali metal hydroxides such as sodium hydroxide, and also bicarbonates and carbonates.

[0043]

The oral composition of the invention is not particularly limited as to the container in which it is filled. For example, in the case of dentifrice compositions, a known tube container may be used. The tube container material is not particularly limited. Specific examples of containers that may be used include single-layer and multilayer containers

made of, for example, polyethylene, polypropylene, polyethylene terephthalate, nylon or aluminum. The tube diameter and the inside diameter of the nozzle are not particularly limited, provided that they fall within normal ranges. For example, the length of the tube body (excluding the nozzle portion) is preferably from 50 to 160 mm, the circumferential
5 length in the width direction is preferably from 20 to 120 mm, and the nozzle inside diameter is preferably from 1 to 10 mm.

EXAMPLES

[0044]

10 The invention is illustrated more fully below by way of Examples and Comparative Examples, although the invention is not limited by these Examples. In the following Examples, unless noted otherwise, all references to percent (%) are by weight.

[0045]

[Example I, Comparative Example I]

15 Dentifrice compositions (toothpaste compositions) formulated as shown in Tables I-1 to I-3 were prepared in the usual manner. Using these as the test samples, the compositions were evaluated by the methods described below. The results are presented in Tables I-1 to I-3.

The component (A)-containing dentifrice compositions had a
20 hypersensitivity-suppressing effect.

[0046]

<Method of Evaluating Feeling on Use>

Evaluations of the feeling on use were carried out by five expert panelists as the subjects on the samples immediately after preparation. One gram of the sample was placed
25 on a toothbrush (CLINICA ADVANTAGE Toothbrush, 4-row Compact, Regular type, from Lion Corporation) and toothbrushing was carried out for 3 minutes. Immediately after the mouth was rinsed out with water, the astringency felt by the gums (referred to below as “feeling of astringency by gums”) and the degree to which an irritating sensation was felt within the mouth (referred to below as “absence of unpleasant irritating sensation”) were
30 each evaluated according to the scoring criteria shown below. The average scores for the five subjects were calculated, and ratings were assigned based on the rating criteria shown below.

When the feeling of astringency by the gums was “○” or better, it was also possible to satisfactorily sense a gum-tightening feeling due to astringency, and so this was regarded as acceptable. When the degree to which an irritating sensation was felt within the mouth was “○” or better, the feeling on use of the sample was good because an unpleasant
5 irritating sensation was not felt, and so this was regarded as acceptable.

[0047]

Scoring Criteria for Feeling of Astringency by Gums

- 5 points: Strong feeling of astringency
- 4 points: Substantial feeling of astringency
- 10 3 points: Slight feeling of astringency
- 2 points: Substantially no feeling of astringency
- 1 point: No feeling of astringency

Rating Criteria for Feeling of Astringency by Gums

- ★: Average score for five subjects is 4.5 points or more
- 15 ◎: Average score for five subjects is 4 points or more but less than 4.5 points
- : Average score for five subjects is 3 points or more but less than 4 points
- ×: Average score for five subjects is less than 3 points

[0048]

Scoring Criteria for Irritating Sensation in Mouth

- 20 5 points: Feel no irritation
- 4 points: Feel substantially no irritation
- 3 points: Feel slight irritation but of a degree that does not pose a problem
- 2 points: Feel substantial irritation
- 1 point: Feel strong irritation

25 Rating Criteria for Irritating Sensation in Mouth

- ★: Average score for five subjects is 4.5 points or more
- ◎: Average score for five subjects is 4 points or more but less than 4.5 points
- : Average score for five subjects is 3 points or more but less than 4 points
- ×: Average score for five subjects is less than 3 points

[0049]

The following were used as component (B).

(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride;

Celquat L-200 from AkzoNobel K.K.

5 (B) O-[2-Hydroxy-3-(trimethylammonio)propyl] guar gum chloride;

Jaguar C-17, from Sansho Co., Ltd.

The ingredients used as components (E) and (F) are subsequently described.

[0050]

10 [Table I-1]

Ingredients (%)	Comparative Example I						
	1	2	3	4	5	6	7
(A) Aluminum lactate	-	2	2	10	1	2	2
Amount of aluminum ions in component (A)	-	0.18	0.18	0.92	0.09	0.18	0.18
(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride	0.15	-	-	0.3	0.15	0.03	2
Hydroxyethyl cellulose (comparative product)	-	-	0.15	-	-	-	-
(Amount of aluminum ions in component (A))/(B), weight ratio	-	-	-	3.07	0.60	6.00	0.09
(D) Tranexamic acid	0.05	0.05	0.05	0.05	0.05	0.05	0.05
(E) Xanthan gum	1	1	1	1	1	1	1
(F) Silicic acid (abrasive)	10	10	10	10	10	10	10
Sodium carboxymethylcellulose	1	1	1	1	1	1	1
Sorbitol solution (70%)	30	30	30	30	30	30	30
Propylene glycol	6	6	6	6	6	6	6
Sodium lauroyl methyl taurate	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Sodium saccharin	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Titanium oxide	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Water	balance	balance	balance	balance	balance	balance	balance
Total	100	100	100	100	100	100	100
Feeling of astringency by gums	×	×	×	☆	×	×	☆
Irritating sensation in mouth	◎	◎	◎	×	☆	◎	×

[0051]

[Table I-2]

Ingredients (%)	Example I									
	1	2	3	4	5	6	7	8	9	10
(A) Aluminum lactate	2	1.2	1.5	5	-	2	2	2	2	2
(A) Aluminum potassium sulfate	-	-	-	-	3	-	-	-	-	-
Amount of aluminum ions in component (A)	0.18	0.11	0.14	0.46	0.31	0.18	0.18	0.18	0.18	0.18
(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride	0.15	0.15	0.15	0.15	0.15	0.04	0.05	0.5	0.8	-
(B) O-[2-Hydroxy-3-(trimethylammonio)propyl] guar gum chloride	-	-	-	-	-	-	-	-	-	0.15
(Amount of aluminum ions in component (A))/(B), weight ratio	1.20	0.73	0.93	3.07	2.09	4.50	3.60	0.36	0.23	1.20
(D) Tranexamic acid	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
(E) Xanthan gum	1	1	1	1	1	1	1	1	1	1
(F) Silicic acid (abrasive)	10	10	10	10	10	10	10	10	10	10
Sodium carboxymethylcellulose	1	1	1	1	1	1	1	1	1	1
Sorbitol solution (70%)	30	30	30	30	30	30	30	30	30	30
Propylene glycol	6	6	6	6	6	6	6	6	6	6
Sodium lauroyl methyl taurate	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Sodium saccharin	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Titanium oxide	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Water	balance	balance	balance	balance	balance	balance	balance	balance	balance	balance
Total	100	100	100	100	100	100	100	100	100	100
Feeling of astringency by gums	☆	○	◎	☆	☆	○	◎	☆	☆	☆
Irritating sensation in mouth	◎	☆	◎	○	◎	☆	☆	◎	○	○

[0052]

[Table I-3]

Ingredients (%)	Example I									
	11	12	13	14	15	16	17	18	19	20
(A) Aluminum lactate	2.5	2.5	3	5	2	2	2	2	2	2
A mount of aluminum ions in component (A)	0.23	0.23	0.28	0.46	0.18	0.18	0.18	0.18	0.18	0.18
(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride	0.9	0.7	0.15	0.1	0.15	0.15	0.15	0.15	0.18	0.15
(Amount of aluminum ions in component (A))/(B), weight ratio	0.26	0.33	1.87	4.60	1.20	1.20	1.20	1.20	1.20	1.20
(C) Polyoxyethylene (5) hydrogenated castor oil	-	-	-	-	2	1	3	-	-	-
(C) Polyoxyethylene (60) hydrogenated castor oil	-	-	-	-	-	-	-	2	1.20	-
(C) Cocamidopropyl betaine	-	-	-	-	-	-	-	-	0.05	-
(D) Tranexamic acid	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	1	-
(E) Xanthan gum	1	1	1	1	1	1	1	1	1	-
(F) Silicic acid (abrasive)	10	10	10	10	10	10	10	10	10	10
Sodium carboxymethylcellulose	1	1	1	1	1	1	1	1	1	2
Sorbitol solution (70%)	30	30	30	30	30	30	30	30	30	30
Propylene glycol	6	6	6	6	6	6	6	6	6	6
Sodium lauroyl methyl taurate	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Sodium saccharin	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Titanium oxide	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Water	balance	balance	balance	balance	balance	balance	balance	balance	balance	balance
Total	100	100	100	100	100	100	100	100	100	100
Feeling of astringency by gums	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Irritating sensation in mouth	○	◎	◎	○	☆	☆	☆	☆	☆	◎

[0053]

[Example II, Comparative Example II]

Toothpaste compositions formulated as shown in Tables II-1 to II-4 were prepared in the usual manner and filled into laminate tube containers (length, 120 mm; circumference, 100 mm; nozzle inside diameter, 2 mm). Using these as the test samples, the compositions were evaluated by the methods described below. The results are presented in Tables II-1 to II-4.

[0054]

<Method of Evaluating Ease of Placing Composition on Toothbrush>

The ribbon formability of the sample was evaluated as the ease of placing the composition on a toothbrush. Evaluations of the feeling on use of the samples immediately after preparation were carried out by five expert panelists. One gram of the toothpaste composition was placed on a toothbrush (CLINICA ADVANTAGE Toothbrush, 4-row Compact, Regular type, from Lion Corporation), and the ease of placing the toothpaste composition on a toothbrush (ribbon formability) was evaluated according to the scoring criteria shown below. The average score for the five subjects was calculated, and ratings were assigned based on the rating criteria shown below.

Scoring Criteria

- 1 point: Substantially no ribbon formability; very difficult to place on toothbrush
- 2 points: Low ribbon formability; difficult to place on toothbrush
- 3 points: Some ribbon formability; somewhat easy to place on toothbrush
- 4 points: Clear ribbon formability; quite easy to place on toothbrush
- 5 points: Good ribbon formability; very easy to place on toothbrush

Rating Criteria (Ratings of “○” and above were treated as acceptable)

- ☆: Average score for five subjects is 4.5 points or more
- ◎: Average score for five subjects is 4 points or more but less than 4.5 points
- : Average score for five subjects is 3 points or more but less than 4 points
- ✕: Average score for five subjects is less than 3 points

[0055]

<Method for Evaluating Squeezability from Tube Container following Storage>

The hardness of a sample following storage was evaluated as the squeezability from a tube container. Immediately after preparation, the sample was stored for one month at
5 60°C. Holding the center of the tube of stored sample with the fingers, the toothpaste composition was forced out onto a piece of paper and the squeezability from a tube container (dischargeability from container) was rated by five expert panelists serving as the subjects. The average score for the five subjects was calculated, and then rated according to the rating criteria shown below. The samples immediately after production all had a good squeezability
10 from a tube container.

Scoring Criteria

- 1 point: Very difficult to squeeze from tube
- 2 points: Difficult to squeeze from tube
- 3 points: Somewhat ease to squeeze from tube
- 15 4 points: Quite easy to squeeze from tube
- 5 points: Very easy to squeeze from tube

Rating Criteria (Ratings of “○” and above were treated as acceptable)

- ★: Average score for five subjects is 4.5 points or more
- ◎: Average score for five subjects is 4 points or more but less than 4.5 points
- 20 ○: Average score for five subjects is 3 points or more but less than 4 points
- ✕: Average score for five subjects is less than 3 points

[0056]

Monat Gum DA (DSP Gokyo Food & Chemical Co., Ltd.) was used as the
25 xanthan gum (E). With regard to component (B), the hydroxyethyl cellulose dimethyldiallylammonium chloride was Celquat L-200 from Nippon NSC K.K., and the O-[2-hydroxy-3-(trimethylammonio)propyl] guar gum chloride was Jaguar C-17 from Sansho Co., Ltd. The ingredients used as component (F) are subsequently described.

[0057]

[Table II-1]

Ingredients (%)	Comparative Example II			
	1	2	3	4
(A) Aluminum lactate	2	2	2	2
Amount of aluminum ions in component (A)	0.18	0.18	0.18	0.18
(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride	-	-	-	-
Hydroxyethyl cellulose (comparative product)	-	-	-	0.15
(E) Xanthan gum	-	-	1	1
Carrageenan (comparative product)	1	-	-	-
Sodium polyacrylate (comparative product)	-	1	-	-
(D) Tranexamic acid	0.05	0.05	0.05	0.05
(F) Silicic anhydride (abrasive)	10	10	10	10
Sodium carboxymethylcellulose	1	1	1	1
Sorbitol solution (70%)	30	30	30	30
Propylene glycol	6	6	6	6
Sodium lauroyl methyl taurate	0.6	0.6	0.6	0.6
Sodium saccharin	0.18	0.18	0.18	0.18
Titanium oxide	0.5	0.5	0.5	0.5
Water	balance	balance	balance	balance
Total	100	100	100	100
Ease of placing on toothbrush	×	×	☆	☆
Squeezability from tube after storage	☆	☆	×	×

[0058]

[Table II-2]

Ingredients (%)	Example II							
	1	2	3	4	5	6	7	8
(A) Aluminum lactate	2	2.5	3.5	5	2	2	2	2
Amount of aluminum ions in component (A)	0.18	0.23	0.32	0.46	0.18	0.18	0.18	0.18
(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
(Amount of aluminum ions in component (A))/(B), weight ratio	1.20	1.53	2.13	3.10	1.20	1.20	1.20	1.20
(E) Xanthan gum	1	1	1	1	0.3	0.5	1.5	3
(B)/(E), weight ratio	0.15	0.15	0.15	0.15	0.5	0.3	0.1	0.05
(D) Tranexamic acid	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
(F) Silicic acid (abrasive)	10	10	10	10	10	10	10	10
Sodium carboxymethylcellulose	1	1	1	1	1	1	1	1
Sorbitol solution (70%)	30	30	30	30	30	30	30	30
Propylene glycol	6	6	6	6	6	6	6	6
Sodium lauroyl methyl taurate	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Sodium saccharin	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Titanium oxide	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Water	balance	balance	balance	balance	balance	balance	balance	balance
Total	100	100	100	100	100	100	100	100
Ease of placing on toothbrush	☆	☆	☉	○	○	☉	☆	○*
Squeezability from tube after storage	☆	☉	☉	○	☆	☆	☉	○

*The sample in Example 8 was somewhat stringy.

[0059]

[Table II-3]

Ingredients (%)	Example II			
	9	10	11	12
(A) Aluminum lactate	2	2	2	2
Amount of aluminum ions in component (A)	0.18	0.18	0.18	0.18
(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride	0.07	0.1	0.5	-
(B) O-[2-Hydroxy-3-(trimethylammonio)propyl] guar gum chloride	-	-	-	0.15
(Amount of aluminum ions in component (A))/(B), weight ratio	2.57	1.80	0.36	1.2
(E) Xanthan gum	1	1	1	1
(B)/(E), weight ratio	0.07	0.1	0.5	0.15
(D) Tranexamic acid	0.05	0.05	0.05	0.05
(F) Silicic anhydride (abrasive)	10	10	10	10
Sodium carboxymethylcellulose	1	1	1	1
Sorbitol solution (70%)	30	30	30	30
Propylene glycol	6	6	6	6
Sodium lauroyl methyl taurate	0.6	0.6	0.6	0.6
Sodium saccharin	0.18	0.18	0.18	0.18
Titanium oxide	0.5	0.5	0.5	0.5
Water	balance	balance	balance	balance
Total	100	100	100	100
Ease of placing on toothbrush	☆	☆	☆	☆
Squeezability from tube after storage	◎	☆	☆	◎

[0060]

Ingredients (%)	Example II	
	13	14
(A) Aluminum lactate	2	2
Amount of aluminum ions in component (A)	0.18	0.18
(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride	0.15	0.15
(Amount of aluminum ions in component (A))/(B), weight ratio	1.20	1.20
(E) Xanthan gum	1	1
(B)/(E), weight ratio	0.15	0.15
(D) Tranexamic acid	0.05	0.05
(F) Silicic anhydride (abrasive)	2	0
Sodium carboxymethylcellulose	1	1
Sorbitol solution (70%)	30	30
Propylene glycol	6	6
Sodium lauroyl methyl taurate	0.6	0.6
Sodium saccharin	0.18	0.18
Titanium oxide	0.5	0.5
Water	balance	balance
Total	100	100
Ease of placing on toothbrush	○	○
Squeezability from tube after storage	☆	☆

[0061]

[Example III, Comparative Example III]

Dentifrice compositions (toothpaste compositions) formulated as shown in Tables III-1 to III-3 were prepared in the usual manner. Using these as the test dentifrices, the compositions were evaluated by the methods described below. The results are presented in Tables III-1 to III-3.

[0062]

<Method of Evaluating Dentinal Tubule Occluding Effect>

The dentin portion of a human molar cut to a thickness of 1 to 2 mm was abraded on one side only with a file and etched by immersing the tooth section in a 37% aqueous phosphoric acid solution for 45 seconds, following which it was rinsed with water and then ultrasonically cleaned (0 cycle). The dentin portion of this human molar was immersed in a test dentifrice supernatant (the supernatant obtained by diluting the test dentifrice threefold with artificial saliva, agitating the dilution for 10 minutes in a shaker and then carrying out 10 minutes of centrifugation at 10,000 rpm) (3-minute immersion in three-fold dilution of test dentifrice with artificial saliva) and then cleaned, following which it was immersed in artificial saliva for 10 minutes at 37°C. This operation was repeatedly carried out a total of five times (5 cycles). The dentinal tubules were then imaged with a laser microscope. In addition, the above operation was repeatedly carried out a total of 20 times (20 cycles), and the dentinal tubules were similarly imaged. The resulting images were rendered into two color tones and the ratio of the open surface area of unoccluded dentinal tubules was determined by the following formula.

$$\begin{aligned} \text{Dentinal tubule open surface area ratio (\%)} = \\ (\text{dentinal tubule open surface area in 5}^{\text{th}} \text{ or 20}^{\text{th}} \text{ cycle} / \text{dentinal} \\ \text{tubule open surface area in 0}^{\text{th}} \text{ cycle}) \times 100 \end{aligned}$$

The dentinal tubule occluding effect was rated based on the criteria shown below from the resulting dentinal tubule open surface area ratio.

Rating Criteria

- ◎◎: Dentinal tubule open surface area ratio is less than 20%
- ◎: Dentinal tubule open surface area ratio is 20% or more and less than 30%
- : Dentinal tubule open surface area ratio is 30% or more and less than 50%
- 5 △: Dentinal tubule open surface area ratio is 50% or more and less than 60%
- ×: Dentinal tubule open surface area ratio is 60% or more

Evaluations of the dentinal tubule occluding effect were carried out using the test dentifrice immediately after production (just-made product) and the test dentifrice stored at 50°C and 75% RH for one month (stored product), the evaluations in each case being
10 carried out following the completion of 5 cycles of the above operation and also following the completion of 20 cycles. These results are indicated as “dentinal tubule occluding effect (just-made product, after 5 cycles or after 20 cycles)” and “dentinal tubule occluding effect (stored product, after 5 cycles or after 20 cycles).”

The immediacy of the effect was rated based on the evaluation results following the
15 completion of 5 cycles, and the stability of the effect was rated by comparing the evaluation results for the just-made product and the stored product following the completion of 20 cycles.
[0063]

<Method of Evaluating Feeling on Use>

The feeling on use was evaluated by five subjects (expert panelists, n = 5) on test
20 dentifrices just after production. One gram of sample was placed on a toothbrush (CLINICA ADVANTAGE Toothbrush, 4-row Compact, Regular type) and toothbrushing was carried out for 3 minutes. Immediately after rinsing, a questionnaire on the taste was conducted and the taste was evaluated based on the scoring criteria shown below. The average score for the five subjects was calculated, and the taste (absence of metallic, bitter
25 or puckery taste) was rated according to the rating criteria shown below.

Scoring Criteria

- 1 points: Feel a strong metallic, bitter or puckery taste
- 2 points: Feel a substantial metallic, bitter or puckery taste
- 3 points: Feel a slight metallic, bitter or puckery taste, but of an acceptable degree
- 30 4 points: Substantially do not feel a metallic, bitter or puckery taste
- 5 point: Do not feel a metallic, bitter or puckery taste

Scoring Criteria

- ◎: Average score for five subjects is 3.5 points or more
- : Average score for five subjects is 2.5 points or more but less than 3.5 points
- △: Average score for five subjects is 2 points or more but less than 2.5 points
- 5 ×: Average score for five subjects is less than 2 points

[0064]

The following ingredients were used as components (B) and (F).

- (B) Hydroxyethyl cellulose dimethyldiallylammonium chloride;
10 Celquat L-200 from AkzoNobel K.K.
- (B) O-[2-Hydroxy-3-(trimethylammonio)propyl] hydroxyethyl cellulose chloride;
Leogard MGP, from Lion Corporation
- (B) O-[2-Hydroxy-3-(trimethylammonio)propyl] guar gum chloride;
Jaguar C-17 from Sansho Co., Ltd.
- 15 (F) Silicic anhydride;
available from Taki Chemical Co., Ltd. under the product name Silicic Anhydride
- (F) Calcium carbonate;
available from Calfine Co., Ltd. under the product name Heavy Calcium Carbonate
- (F) Calcium phosphate;
20 available from Tosoh Akzo Corporation under the product name Dicalcium Phosphate
Dihydrate

The ingredient used as component (E) was that mentioned above.

[0065]

[Table III-1]

Ingredients (%)	Example III						
	1	2	3	4	5	6	7
(A) Aluminum lactate	1.2	1.5	1.5	1.5	1.5	1.5	1.5
(A) Aluminum chloride	-	-	-	-	-	-	-
Amount of aluminum ions in component (A)	0.11	0.14	0.14	0.14	0.14	0.14	0.14
(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride	0.1	0.1	0.05	0.15	0.3	-	-
(B) O-[2-Hydroxy-3-(trimethylammonio)propyl] hydroxyethylcellulose chloride	-	-	-	-	-	0.3	-
(B) O-[2-Hydroxy-3-(trimethylammonio)propyl] guar gum chloride	-	-	-	-	-	-	0.3
(Amount of aluminum ions in component (A))/(B), weight ratio	1.10	1.40	2.80	0.93	0.47	0.47	0.47
(E) Xanthan gum	1.2	1.2	1.2	1.2	1.2	1.2	1.2
(F) Silicic anhydride	10	10	10	10	10	10	10
Sodium carboxymethylcellulose	1	1	1	1	1	1	1
Sorbitol solution (70%)	30	30	30	30	30	30	30
Propylene glycol	5	5	5	5	5	5	5
Sodium lauroyl methyl taurate	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sodium saccharin	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Titanium oxide	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Flavor	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Sodium hydroxide	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Water	balance	balance	balance	balance	balance	balance	balance
Total	100	100	100	100	100	100	100
Dentinal tubule occluding effect (just-made product, after 5 cycles)	○	◎	○	◎	◎	◎	◎
Dentinal tubule occluding effect (just-made product, after 20 cycles)	◎	◎	◎	◎	◎	◎	◎
Dentinal tubule occluding effect (stored product, after 5 cycles)	○	○	○	○	◎	○	○
Dentinal tubule occluding effect (stored product, after 20 cycles)	○	○	○	◎	◎	◎	○
Taste (absence of metallic, bitter or puckery taste)	◎	◎	◎	◎	◎	◎	◎

[0066]

[Table III-2]

Ingredients (%)	Example III											
	8	9	10	11	12	13	14	15	16	17	18	19
(A) Aluminum lactate	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Amount of aluminum ions in component (A)	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.15	0.3
(Amount of aluminum ions in component (A))/(B), weight ratio	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	0.93	0.47
(E) Xanthan gum	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
(F) Silicic anhydride	5	15	25	30	-	-	10	10	10	10	10	10
(F) Calcium carbonate	-	-	-	-	15	-	-	-	-	-	-	-
(F) Calcium phosphate	-	-	-	-	-	15	-	-	-	-	-	-
(G) Sodium monofluorophosphate	-	-	-	-	-	-	0.1	1	2	5	1	1
Sodium carboxymethylcellulose	1	1	1	1	1	1	1	1	1	1	1	1
Sorbitol solution (70%)	30	30	30	30	30	30	30	30	30	30	30	30
Propylene glycol	5	5	5	5	5	5	5	5	5	5	5	5
Sodium lauroyl methyl taurate	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sodium saccharin	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Titanium oxide	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Flavor	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Sodium hydroxide	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Water	balance	balance	balance	balance	balance	balance	balance	balance	balance	balance	balance	balance
Total	100	100	100	100	100	100	100	100	100	100	100	100
Dentinal tubule occluding effect (just-made product, after 5 cycles)	◎	◎	○	○	◎	○	◎	◎	◎	◎	◎	◎◎
Dentinal tubule occluding effect (just-made product, after 20 cycles)	◎	◎	○	○	◎	◎	◎	◎◎	◎◎	◎◎	◎◎	◎◎
Dentinal tubule occluding effect (stored product, after 5 cycles)	○	○	○	▲	○	○	○	◎	◎	◎	◎	◎
Dentinal tubule occluding effect (stored product, after 20 cycles)	◎	○	○	○	○	○	◎	◎	◎	◎	◎	◎◎
Taste (absence of metallic, bitter or puckery taste)	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	◎

[0067]

[Table III-3]

Ingredients (%)	Comparative Example III		
	1	2	3
(A) Aluminum lactate	-	1.5	1.5
Amount of aluminum ions in component (A)	-	0.14	0.14
(B) Hydroxyethyl cellulose dimethyldiallylammonium chloride	0.1	-	-
Hydroxyethylcellulose (comparative product)	-	-	0.5
(E) Xanthan gum	1.2	1.2	1.2
(F) Silicic anhydride	10	10	10
Sodium carboxymethylcellulose	1	1	1
Sorbitol solution (70%)	30	30	30
Propylene glycol	5	5	5
Sodium lauroyl methyl taurate	0.5	0.5	0.5
Sodium saccharin	0.18	0.18	0.18
Titanium oxide	0.5	0.5	0.5
Flavor	1.2	1.2	1.2
Sodium hydroxide	0.75	0.75	0.75
Water	balance	balance	balance
Total	100	100	100
Dentinal tubule occluding effect (just-made product, after 5 cycles)	×	×	×
Dentinal tubule occluding effect (just-made product, after 20 cycles)	×	○	○
Dentinal tubule occluding effect (stored product, after 5 cycles)	×	×	×
Dentinal tubule occluding effect (stored product, after 20 cycles)	×	×	×

[0068]

As shown in Table III-3, Comparative Example 1 which do not include component (A) and Comparative Examples 2 and 3 which do not include component (B) all had a dentinal tubule occluding effect in just-made product (after 5 cycles) and a dentinal tubule occluding effect in stored product (after 5 cycles and after 20 cycles) which were low, resulting in inferior immediacy and stability of the effect. By contrast, as shown in Tables III-1 and III-2, the dentifrice compositions in the Examples according to the invention which include at least a specific amount of component (A) and which include in combination component (B) and also component (F) had a high dentinal tubule occluding effect in just-made product (after 5 cycles and after 20 cycles) and a dentinal tubule occluding effect in stored product (after 5 cycles and after 20 cycles) which were high, indicating an excellent immediacy and stability of the effect, and also had a good-tasting feeling on use. When component (G) was additionally included, the dentinal tubule occluding effect rose even higher, resulting in even better immediacy and stability of the effect.

[0069]

The toothpaste compositions shown in Examples I, II and III that were formulated with components (A) and (B) in the specific weight ratio according to the invention were excellent in terms of the feeling of astringency by the gums and the absence of an unpleasant irritating sensation. In addition, when component (E) was included, the ease of placing the composition on a toothbrush and the squeezability of the composition from a tube after storage were also outstanding. Even in cases where component (F) was included, the dentinal tubule occluding effect in just-made product (after 5 cycles and after 20 cycles) and the dentinal tubule occluding effect in stored product (after 5 cycles and after 20 cycles) were both high, indicating excellent immediacy and stability of this effect. Moreover, the taste (lack of metallic, bitter or puckery taste) was also excellent.

CLAIMS:

1. An oral composition comprising:
(A) a water-soluble aluminum salt, and
5 (B) a cationic polymer compound,
wherein the content of component (A) in terms of aluminum ions is from 0.1 to 0.5 wt%
and the weight ratio expressed as (amount of aluminum ions in component (A))/(B) is
from 0.23 to 5.
- 10 2. The oral composition of claim 1, wherein the water-soluble aluminum salt (A) is
one or more selected from the group consisting of aluminum lactate, aluminum potassium
sulfate, aluminum chloride, aluminum nitrate and aluminum sulfate.
3. The oral composition of claim 1 or 2, wherein the cationic polymer compound (B)
15 is one or more selected from the group consisting of cationized cellulose and cationized
guar gum.
4. The oral composition of any one of claims 1 to 3, wherein the weight ratio
expressed as (amount of aluminum ions in component (A))/(B) is from 0.3 to 3.1.
20
5. The oral composition of any one of claims 1 to 4, wherein the content of
component (B) is from 0.03 to 2 wt%.
6. The oral composition of any one of claims 1 to 5, further comprising (C) from
25 0.2 to 5 wt% of one or more selected from (C-1) nonionic surfactants and (C-2) betaine-type
amphoteric surfactants.
7. The oral composition of claim 6, wherein the nonionic surfactant (C-1) is selected
from the group consisting of polyoxyethylene hydrogenated castor oils having an average
30 number of moles of added ethylene oxide of from 5 to 100 and polyoxyethylene alkyl ethers
having an alkyl group of 10 to 18 carbon atoms and an average number of moles of added

ethylene oxide of from 5 to 40, and the betaine-type amphoteric surfactant (C-2) is a fatty acid amidopropyl betaine having an alkyl group of 10 to 16 carbon atoms.

8. The oral composition of any one of claims 1 to 7, further comprising (D) from
5 0.01 to 5 wt% of an anti-inflammatory ingredient.
9. The oral composition of any one of claims 1 to 8, further comprising (E) xanthan gum.
10. The oral composition of claim 9, wherein the content of component (E) is from
10 0.1 to 3 wt%.
11. The oral composition of claim 9 or 10, wherein the weight ratio (B)/(E) is 0.01 or more.
12. The oral composition of any one of claims 1 to 11, further comprising (F) one or
15 more selected from the group consisting of silica, calcium carbonate and calcium phosphate.
13. The oral composition of claim 12, wherein the content of component (F) is from
3 to 30 wt%.
14. The oral composition of claim 12 or 13, further comprising (G) a water-soluble
20 fluorine compound.
15. The oral composition of claim 14, wherein the water-soluble fluorine compound (G)
25 is sodium monofluorophosphate and the content thereof is from 0.1 to 5 wt%.
16. The oral composition of any one of claims 1 to 15 which is a toothpaste composition.
17. The oral composition of any one of claims 1 to 16 which is for use in suppressing or
30 preventing hypersensitivity.