TITLE OF THE INVENTION

ORAL COMPOSITION CONTAINING MORIN

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Patent Application No. 11/256,784 filed October 24, 2005, which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] Periodontal disease is inflammation of some or all of the tooth's support structures such as gingiva, cementum, periodontal ligament, and alveolar bone. The inflammation which generally results from infection of bacteria destroys the attachment fibers and supporting bone that hold the teeth in the mouth, leading to loss of teeth. Gingivitis and periodontitis are the most common periodontal diseases.

[0003] Among various factors causing periodontal diseases, oxidative cell damage is increasingly recognized as a source of tissue damage in the host and leads to inflammation. Oxidative free radicals are used by the body as defense systems against antigen attacks. However, when the response by the host is uncontrolled it leads to damage to tissues of the host such as seen in oral gingivitis. Therefore, an anti-oxidant that may suppress oxidative free radicals may provide a beneficial effect in mitigating inflammation processes of dental-related diseases.

[0004] Dentifrices comprising an effective amount of a stannous compound capable of yielding stannous ions upon association with water, and an effective amount of a compound that is a radical inhibitor capable of reducing or preventing the conversion of the stannous ions in the dentifrice composition into stannic ions, wherein the antioxidant is morin. However, this publication does not disclose use of an antibacterial enhancing agent in a dentifrice to prevent or reduce an inflammatory process.

BRIEF SUMMARY OF THE INVENTION

[0005] In accordance with the present invention, there is provided an oral composition consisting essentially of an anti-oxidative effective amount of morin and a water-humectant phase.

[0006] There is also provided an oral composition with stability and anti-oxidative efficacy, wherein the composition comprises morin, a fluoride ion source, an antibacterial enhancing agent and a water-humectant phase containing a solubilizing agent.

[0007] There is further provided an oral composition with stability and anti-oxidative efficacy, wherein the composition comprises morin, one or more antibacterial agents, an antibacterial enhancing agent and a water-humectant phase containing a solubilizing agent.

[0008] In accordance with another aspect of the present invention, there is provided a method of preventing or reducing inflammatory process, wherein the method comprises administering to the oral cavity of human or animal subject, an effective amount of a composition consisting essentially of morin and a water-humectant phase.

[0009] There is further provided a method of preventing or reducing inflammatory process, wherein the method comprises administering to the oral cavity of human or animal subject an effective amount of a composition comprising morin, a water-humectant phase, one or more antibacterial agents, an antibacterial enhancing agent, and a fluoride ion source.

[0010] In one embodiment, there is further provided a method of preventing or reducing inflammatory process, wherein the method comprises administering to the oral cavity of human or animal subject an effective amount of a composition comprising morin, a water-humectant phase, one or more antibacterial agents, a fluoride ion source, and an antibacterial enhancing agent.

BRIEF DESCRIPTION OF THE DRAWINGS

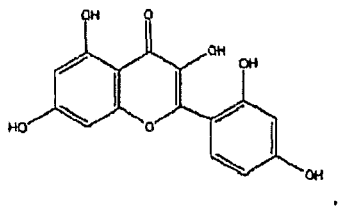
[0011] FIG. 1 is a graph showing anti-oxidant activity of a simple solution containing morin.

[0012] FIG. 2 is a graph showing comparative data for anti-oxidant activity of control, placebo, compositions containing morin, and a composition containing vitamin E.

DETAILED DESCRIPTION OF THE INVENTION

[0013] The present invention arises from a finding that a composition of oral care vehicles containing morin exhibits stability and anti-oxidative efficacy. Also, it is found that morin exhibits an additive effect when combined with a broad spectrum antibacterial such as triclosan.

[0014] An oral composition in accordance with the present invention comprises morin as anti-oxidant. Morin (2',3,4',5,7-pentahydroxyflavone) is a phenolic compound belonging to the group of flavonoid plant dyes and has the following structure:



[0015] In one embodiment, an oral composition consists essentially of morin and a water-humectant phase. The oral composition containing morin is useful to alleviate tissue damage caused by oxidative free radicals. In another embodiment, an oral composition comprises morin, a water-humectant phase, and other ingredients effective to kill bacteria or to reduce inflammatory processes. Morin, can be combined with other therapeutic agents to broaden or strengthen oral hygiene efficacy of an oral composition. For example, when combined with an anti-caries agent, an oral composition containing morin and the anti-caries agent can be utilized for dual purposes, *i.e.*, treating tooth decay and periodontal disease.

[0016] Other therapeutic agents include, but are not limited to, anticaries agents and antibacterial agents, and antibacterial enhancing agents. Though any known therapeutic agents can be used together with morin, it may be preferable to combine fluoride sources and/or triclosan with morin.

[0017] Morin is added to oral compositions in an effective amount to, thereby preventing or treating oral inflammatory diseases. Morin may be present at amount of about 0.1% to about 30%, preferably, about 0.5% to about 10% by weight of the oral composition.

[0018] An oral composition in accordance with the present invention may contain one or more antibacterial agents in addition to morin. Addition of antibacterial agents may enhance or broaden antibacterial efficacy of the dentifrice composition. Such antibacterial agents include non-cationic antibacterial agents which are based on phenolic or bisphenolic compounds, such as halogenated diphenyl ethers such as triclosan (2,4,4'-trichloro-2'-hydroxydiphenyl ether). Other useful antibacterial agents are, for example, arginate esters, or salts, cetyl pyrinidium salts, phenolic antibacterial compounds (menthol, magonol, honokiol).

[0019] Preferably, triclosan can be used together with morin to strengthen anti-oxidative efficacy and to broaden antibacterial activity of an oral formulation. An oral composition comprising morin and triclosan may not only suppress inflammatory processes by anti-oxidative activity of the composition but also kill pathogens causing dental-related diseases.

[0020] These antibacterial agents are included in the dentifrice composition at a concentration of about 0.1% to about 30% by weight of the oral composition.

[0021] An oral composition of the present invention may also contain a source of fluoride ions or fluorine-providing ingredient, as anticaries agent in amounts sufficient to supply about 25 ppm to 5,000 ppm of fluoride ions and include inorganic fluoride salts, such as soluble alkali metal salts. In one embodiment, an oral composition comprises morin, a water-humectant phase, and a fluoride source. The formulation may be useful to prevent or treat various dental-related diseases such as, for example, tooth decay, gingivitis, and periodontitis.

[0022] In another embodiment, a fluoride source is added to an oral composition comprising morin and one or more bacterial agents to broaden the spectrum of oral care efficacy of the composition. For example, a preferred antibacterial agent may be triclosan and a preferred fluoride ion source may include sodium fluoride, potassium fluoride, sodium fluorosilicate, sodium monfluorophosphate (MFP), and ammonium fluorosilicate.

[0023] In addition to fluoride compounds, there may also be included in the oral compositions of the present inventions antitartar agents such as pyrophosphate salts including dialkali or tetraalkali metal pyrophosphate salts such as $Na_4P_2O_7$, $K_4P_2O_7$, $Na_2K_2P_2O_7$, $Na_2H_2P_2O_7$ and $K_2H_2P_2O_7$, polyphosphates such as sodium tripolyphosphate, sodium hexametaphosphate and cyclic phosphates such as sodium tripolyphosphate sodium trimetaphosphate.

[0024] Synthetic anionic polycarboxylates may also be used in the oral compositions of the present invention as an efficacy enhancing agent for morin, for any antibacterial, antitartar or other active agent within the dentifrice composition. Such anionic polycarboxylates are generally employed in the form of their free acids or preferably partially or more preferably fully neutralized water soluble alkali metal (*e.g.*, potassium and preferably sodium) or ammonium salts. Preferred are 1:4 to 4:1 copolymers of maleic anhydride or acid with another polymerizable ethylenically unsaturated monomer, preferably methylvinylether/maleic anhydride having a molecular weight (M.W.) of about 30,000 to about 1,800,000, and most preferably about 30,000 to about 700,000. Examples of these copolymers are available from GAF Corporation under the tradename GANTREZ®, *e.g.*, AN 139 (M.W. 500,000), AN 119 (M.W. 250,000); S-97 Pharmaceutical Grade (M.W. 700,000), AN 169 (M.W. 1,200,000-1,800,000), and AN 179 (M.W. above 1,800,000).

[0025] When present, the anionic polycarboxylate is employed in amounts effective to achieve the desired enhancement of the efficacy of any antibacterial, antitartar or other active agent within the oral composition.

[0026] Orally-acceptable vehicles used to prepare dentifrice compositions of the present invention include a water-phase, containing a humectant therein. The humectant is preferably glycerin, sorbitol, xylitol, dipropylene glycol, methyl cellosolve, ethyl cellosolve, olive oil, castor oil, amyl acetate, ethyl acetate, glyceryl tristearate and benzyl benzoate and/or propylene glycol; but, other humectants and mixtures thereof may also be employed.

[0027] In the preparation of a dentifrice composition, abrasives which may be used in the practice of the present invention include silica abrasives such as precipitated silicas having a mean particle size of up to about 20 microns, such as ZEODENT® 115, marketed by J. M. Huber. Other useful dentifrice abrasives include sodium metaphosphate, potassium metaphosphate, tricalcium phosphate, dihydrated dicalcium phosphate, aluminum silicate, calcined alumina, bentonite and other siliceous materials, and combinations thereof.

[0028] Thickeners used in the dentifrice compositions of the present invention include natural and synthetic gums and colloids. Thickeners compatible with the present composition include cellulose thickeners such as carboxymethyl cellulose, hyroxyalkyl celluloses such as hydroxypropyl cellulose hydroxyethyl cellulose, gums such as xanthan gum, polyglycols of varying molecular weights sold under the tradename Polyox and polyethylene glycol. Inorganic thickeners which may be used in the practice of the present invention include amorphous silica compounds such as colloidal silicas compounds available under the trade designation CAB-O-SIL® manufactured by Cabot Corporation and distributed by Lenape Chemical, Bound Brook, N.J.; ZEODENT® 165 from J. M. Huber Chemicals Division, Havre de Grace, Md. 21078; and SYLODENT® 15, available from Davison Chemical Division of W. R. Grace Corporation, Baltimore, Md. 21203. Other inorganic thickeners include natural and synthetic clays, lithium magnesium silicate and magnesium aluminum silicate.

[0029] Surfactants are used in the oral compositions of the present invention to achieve increased prophylactic action and render the compositions more cosmetically acceptable. The surfactant is preferably a detersive material which imparts to the composition detersive and foaming properties.

[0030] The oral composition of the present invention may also contain flavoring agents and/or breath freshening antiplaque actives. Flavoring agents which are used in the practice of the present invention include essential oils as well as various flavoring aldehydes, esters, alcohols, and similar materials. Examples of the essential oils include oils of spearmint, peppermint, wintergreen, sassafras, clove, sage, eucalyptus, marjoram, cinnamon, lemon, lime, grapefruit, and orange. Also useful are such chemicals as menthol, carvone, and anethole. Of these, the most commonly employed are the oils of peppermint and spearmint.

[0031] The sweetener content will normally be that of an artificial or synthetic sweetener (non-sugar).

[0032] Various other materials may be incorporated in the oral compositions of this invention, including desensitizers, such as potassium nitrate; whitening agents, such as hydrogen peroxide, calcium peroxide and urea peroxide; preservatives; silicones; and chlorophyll compounds. These additives, when present, are incorporated in the oral compositions of the present invention in amounts which do not substantially adversely affect the properties and characteristics desired.

[0033] In one embodiment, an oral composition containing morin can be used in a method to prevent or treat dental-related diseases, particularly gingivitis and/or periodontitis, by administering to the oral cavity of human or animal the composition. The method using a morin composition is especially useful to prevent or treat dental inflammatory diseases such as gingivitis and periodontitis since the present dentifrice compositions have superior anti-oxidative efficacy. To broaden the scope of target disease to be treated, one or more other therapeutic agents can be added to the morin composition. For example, a composition comprising morin and an anti-caries agent can be used in a method to prevent or treat tooth decay, gingivitis, and periodontitis. Preferably, the dentifrice composition to be administered may contain one or more conventional antibacterial agents such as triclosan, fluoride, an arginate ester, solbrol and cetyl pyrinidium salts. An oral composition containing morin to be used for the method may be prepared by suitably mixing other ingredients as mentioned above.

[0034] For effective treatment of dental-related disease, morin may be administered to the oral cavity of human or animal in amount of about 10 ppm to about 10,000 ppm, preferably, about 100 ppm to about 5,000 ppm. And a therapeutic agent used together with morin may be

administered to human or animal in amount of about 10 ppm to about 10,000 ppm, preferably, about 100 ppm to about 5,000 ppm.

[0035] The oral composition to be used in the method can be further processed to different types of final products so as to meet consumer needs. For example, the composition to be administered to human or animal may be in a form selected from pet treats, toys, breath strips, mouthwash, toothpaste, liquid whitener, chewing gum, bead, chew, and lozenge.

[0036] The invention is further illustrated but not limited by the following Examples. Variations of the following examples are possible without departing from the scope of the invention.

EXAMPLES

Example 1

[0037] The anti-oxidant efficacy of morin in simple solutions was tested using the LPO-CC Kamiya Bioscience kit which is a spectroscopy-based assay that measures the amount of methylene blue produced. Reaction processes in the kit used can be summarized as follows. Cumene hydroperoxide (CHO) is combined with an enzyme mixture of ascorbic oxidase and lipoprotein lipase in order to produce lipid peroxide. Samples and standards are then combined with a second reagent containing methyl carbamate (MCDP) and hemoglobin. In the presence of hemoglobin, lipid peroxides are converted to lipid alcohols which in turn convert the MCDP to methylene blue that can be read at 674nm. This translates to decreased color intensity which is measured by spectroscopy at 674nm. If the active is an anti-oxidant, it should drop the optical density reading from that which was taken from the standard curve. In other words, the lower the optical density reading the better the anti-oxidant efficacy.

[0038] A simple composition containing 1.0% by weight of morin was tested by the kit above and compared with a simple composition containing 1.0% by weight of vitamin E. Fig. 1 illustrates the result of the experiment. As shown in Fig. 1, morin exhibited anti-oxidative efficacy as good as positive control vitamin E.

Example 2

[0039] Anti-oxidant efficacy of oral compositions containing morin was tested, using the LPO-CC Kamiya Bioscience kit. A dentifrice base was prepared using the ingredients listed in Table 1 below:

TABLE I

Ingredients	Weight (g)
Water	16.3
Sodium saccharin	0.3
Sodium fluoride	0.2
Glycerin (99.5%)	20.0
Sodium carboxymethyl cellulose	1.1
Iota carrageenan	0.4
Titanium dioxide	0.5
Sorbitol non-browning (70%)	20.9
GANTREZ® S-97 (15%)	15.0
Sodium hydroxide (50%)	1.2
ZEODENT® 115	20.0
ZEODENT® 165	1.5
Active	0.1
Flavor	1.0
Sodium lauryl sulfate powder	1.5
TOTAL	**100.0**

[0040] Three types of oral compositions, Compositions A, B, and C, were formulated based upon the common dentifrice base prepared above. Composition A was formulated to contain 0.3% morin, 1.0% flavor, 1.5% sodium lauryl sulfate powder, 1.5% Zeodent 165, 20.0% Zeodent 115, and 75.4% dentifrice base. Composition B was formulated to contain 0.3% triclosan, in addition to the ingredients of composition A. Composition C is similar to composition A except that it employed 0.3% vitamin E as anti-oxidative agent instead of morin. The components of the compositions used in a comparative experiment are summarized in the chart below:

TABLE II

	Weight (%)			
Composition No.	**Placebo**	**A**	**B**	**C**
Ingredients				
Triclosan	-	-	0.3	-
Morin	-	0.3	0.3	-
Vitamin E	-	-	-	0.3
Flavor	1.0	1.0	1.0	1.0
Sodium lauryl sulfate powder	1.5	1.5	1.5	1.5
ZEODENT® 165	1.5	1.5	1.5	1.5
ZEODENT® 115	20	20.0	20.0	20.0
Dentifrice base	76	75.7	75.4	75.7
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**

[0041] Anti-oxidative efficacy of each composition was evaluated with the same protocol as used in Example 1. Fig. 2 shows the anti-oxidative efficacy of the compositions. Composition A containing morin, only, as anti-oxidant, exhibited anti-oxidant efficacy well over the control paste (placebo). Furthermore, composition A was shown to be superior to composition C containing vitamin E in terms of anti-oxidative efficacy. In addition, composition B comprising morin and triclosan was found to have slightly stronger anti-oxidative efficacy than composition A.

[0042] Although the invention has been described with reference to specific examples, it will be apparent to one skilled in the art that various modifications may be made thereto which fall within its scope.

We claim:

1. An oral composition consisting essentially of an anti-oxidative effective amount of morin and a water-humectant phase containing a solubilizing agent.

2. The oral composition of claim 1, wherein the morin is present at amount of about 0.001% to about 30% by weight.

3. The oral composition of claim 1, wherein the solubilizing agent is selected from the group consisting of propylene glycol, dipropylene glycol, methyl cellosolve, ethyl cellosolve, olive oil, castor oil, amyl acetate, ethyl acetate, glyceryl tristearate and benzyl benzoate.

4. An oral composition comprising an anti-oxidative effective amount of morin, a fluoride ion source, an antibacterial enhancing agent and a water-humectant phase containing a solubilizing agent.

5. The oral composition of claim 4, wherein the morin is present at amount of about .01% to about 30% by weight.

6. The oral composition of claim 4, wherein the solubilizing agent is selected from the group consisting of propylene glycol, dipropylene glycol, methyl cellosolve, ethyl cellosolve, olive oil, castor oil, amyl acetate, ethyl acetate, glyceryl tristearate and benzyl benzoate.

7. The oral composition of claim 4, wherein a fluoride ion source is selected from the group consisting of sodium fluoride, potassium fluoride, ammonium fluoride, calcium fluoride, cuprous fluoride, zinc fluoride, stannous fluoride, and barium fluoride.

8. The oral composition of claim 4, wherein the oral composition further comprises an ingredient selected from the group consisting of a polishing agent, a surfactant, a flavoring agent, and a sweetener.

9. An oral composition with stability and anti-oxidative efficacy, the composition comprising morin, one or more antibacterial agents, an antibacterial enhancing agent, and a water-humectant phase containing a solubilizing agent.

10. The oral composition of claim 9, wherein the solubilizing agent is selected from the group consisting of propylene glycol, dipropylene glycol, methyl cellosolve, ethyl cellosolve, olive oil, castor oil, amyl acetate, ethyl acetate, glyceryl tristearate and benzyl benzoate.

11. The oral composition of claim 9, wherein the therapeutic agent is selected from the group consisting of herbs, moisturizers, whitening, anti-attachment agents, triclosan, an arginate ester, solbrol and cetyl pyrinidium salts.

12. The oral composition of claim 9, wherein the oral composition further comprises a fluoride ion source.

13. The oral composition of claim 12, wherein a fluoride ion source is selected from the group consisting of sodium fluoride, potassium fluoride, ammonium fluoride, calcium fluoride, cuprous fluoride, zinc fluoride, stannous fluoride, and barium fluoride.

14. The oral composition of claim 1, wherein the oral composition further comprises an ingredient selected from the group consisting of a polishing agent, a surfactant, a flavoring agent, and a sweetener.

15. An oral care article-of-manufacture consisting essentially of an anti-oxidative effective amount of morin and a water-humectant phase, wherein the oral care article is in a form selected from the group consisting of mouthwash, oral strip, toothpaste, liquid whitener, chewing gum, bead, chew, lozenge and spray.

16. The oral care article-of-manufacture of claim 15, wherein the oral care article-of-manufacture further comprises one or more antibacterial agents, a fluoride ion source, and an antibacterial enhancing agent.

17. A method of preventing or reducing an inflammatory process, comprising administering to the oral cavity of human or animal subject an anti-oxidative effective amount of a composition consisting essentially of morin and a water-humectant phase.

18. The method of claim 17, wherein morin is provided in amount of about 10 ppm to about 10,000 ppm.

19. A method of preventing or treating a dental-related disease, comprising administering to the oral cavity of human or animal subject an anti-oxidative effective amount of a composition comprising morin, a water-humectant phase, an antibacterial agent, an antibacterial enhancing agent, and a fluoride ion source.

20. The method of claim 19, wherein morin is provided in amount of about 100 ppm to about 5,000 ppm.

21. The method of claim 17 or 19, wherein the method is used to prevent or treat gingivitis or periodontitis.

22. The method of claim 17 or 19, wherein the composition is provided in a form selected from the group consisting of mouthwash, oral strip, toothpaste, liquid whitener, chewing gum, bead, chew, lozenge, pet treats and toys, and spray.