Title: PELARGONIUM SIDOIDES SYRUP

Abstract: The present invention relates to a Pelargonium sidoides syrup used as a therapeutic agent for acute or chronic infections. The present invention can dramatically improve the bitter taste and unpleasant odor of the drug compared to conventional liquid preparations of Pelargonium sidoides extract. Therefore, patient's compliance to the drug is increased, and the drug can be easily administered to children or seniors. Since the present invention provides a content analysis method of Pelargonium sidoides extract which is responsible for the manifestation of efficacy, a syrup having a potency equal to or greater than an exact reference value can be produced, and it is now possible to maintain the potency of actually manufactured syrup products at a certain level, thus quantitative formulation into a syrup preparation being achieved. Moreover, the quantitative analysis method for the Pelargonium sidoides extract of the present invention has enabled the measurement of component contents in a syrup containing the Pelargonium sidoides extract, and the analysis method has an advantage of showing excellent reproducibility and high reliability through relatively simple operations.
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Description

PELARGONIUM SIDOIDES SYRUP

Technical Field

The present invention relates to a Pelargonium sidoides syrup which is used as a therapeutic agent for an acute or chronic infection.

Background Art

An extract extracted from the roots of Pelargonium species such as Pelargonium sidoides and Pelargonium reniforme, which grow naturally in Southern Africa, has been widely used traditionally in Africa as a therapeutic agent for diarrhea, gastrointestinal complaints, dysmenorrhea, liver diseases and the like (Watt, C. (1962) Medicinal and poisonous plants of southern and eastern Africa. Livingstone, Edinburgh, London, S. 449-455). In addition to that, the extract is known to have outstanding effects in the treatment of diseases in the respiratory system, and particularly tuberculosis.

It is known that the Pelargonium sidoides extract which is known to be used originally in South Africa as a traditional medicinal material, has also been used as a medicinal material in other areas, specifically in the central part of Chile, Mexico and others. That is, in the above-described regions, the extract of Pelargonium sidoides has been used in remedy of diarrhea or various gastrointestinal syndromes, by making use of the astringent function possessed by the extract. These effects are known to be attributable to tannin, which is a constituent component of the extract (Jbse San Martin, A. (1983) Econom. Bot., 37, 216-227; INI (1994) Atlas de las plantas de la medicina tradicional mexicanas (Institute Nacional Indigenista, Hrsg.) W. II, Av. Revolucion no 1279, Col. Tiacopac, Mexiko, S. 667 und 950).

Moreover, in the early 20th century, a root extract of Pelargonium sidoides was used also in the United States, under the name of Umckaloabo, for the treatment of infection in the upper airway (Kauffer, HJ. (1915) Dental Cosmos 57, 1366), for example, rhinopharyngitis, tonsillitis, sinusitis, bronchitis and the like.

These effects are known to be attributable to the antimicrobial effects of the Pelargonium sidoides extract.

More specifically, it was found through a coumarin test that the Pelargonium sidoides extract has a moderate degree of cytotoxicity against GLC4, lung cancer cells and COLO320 cells, and it was shown that such cytotoxic effect was totally dependent on the nature and position of the substituents on the aromatic rings. Further, the extract...
exhibited a moderate degree of bacteriostatic effects in an experiment performed through an agar dilution test using coumarin and a tannin compound for the antimicrobial action against various Gram-positive and Gram-negative bacteria. The minimal inhibitory concentration (MIC) value is from 200 to 2000 µg/ml (in the case of coumarin), and from 500 to 2000 µg/ml (in the case of monomer tannin precursor), and representative substances having a high degree of antibacterial action include coumarin trioxide and tetraoxide. Such definite antibacterial action is exhibited by an extract, particularly an extract of the roots and leaves, of *Pelargonium sidoides*, and as for the solvent, water exhibits the greatest antibacterial effects (Kayser, O. (1997) Phenolic constituents of *Pelargonium sidoides* DC. and studies of the efficacy of the Umcka plant material (*Pelargonium sidoides* DC. and *Pelargonium reniforme* CURT.), Doctorial dissertation, Berlin Free University).

[7] Meanwhile, the *Pelargonium sidoides* extract is useful in the treatment of an acute or chronic infection, as the extract exerts influence on the immunoregulatory effects.

[8] Specifically, the *Pelargonium sidoides* extract is reported to enhance the synthesis of TNF-α, INF-β and nitric oxide (NO) (H. Kolodziej et al., Phytomedicine 10 (Suppl. 4), 18-24 (2003)).

[9] Moreover, investigations reported that coumarins derived from the *Pelargonium sidoides* extract exhibit immunostimulatory effects in various experimental models. Specifically, in an intracellular Leishmania infection model, these substances exhibited a moderate degree of effect in a structure-dependent manner in relation to the oxygen-dependent immune defense mechanism, and in particular, a moderate degree of stimulation of the defense mechanism to the intracellular infection via the NO production mediated by simple coumarin was shown to increase according to the degree of increase in oxygen generation. Furthermore, gallic acid, which is another constituent component of the extract, is an excellent derivative, whose activity is attributed to nitric oxide radicals (Kayser, O. (1997) Phenolic constituents of *Pelargonium sidoides* DC. and studies of the efficacy of the Umcka plant material (*Pelargonium sidoides* DC. and *Pelargonium reniforme* CURT.), Doctorial dissertation, Berlin Free University).

[10] Such *Pelargonium sidoides* extract has been currently confirmed to be effective in acute or chronic infections, and particularly in infections in the respiratory system or otorhinolaryngeal areas, such as bronchitis, sinusitis, tonsillitis and rhinopharyngitis.

[11] Meanwhile, syrup preparations are advantageous in that they can be easily administered to children or seniors who lack the ability to swallow tablets, they exhibit
the effects of drug quickly compared to tablets, and they can reduce the differences in bioavailability which may be caused by the differences in drug solubility of individual preparations when administered in the form of tablets. Furthermore, upon oral administration, the bitter taste and unpleasant odor of the drug can be dramatically improved, so that patients’ compliance to the drug is enhanced, and the drug can be easily administered to children or seniors.

However, in the case of *Pelargonium sidoides* extract, the content analysis method for the extract which is responsible for the manifestation of efficacy has not been established, thus it being difficult to produce syrups having a potency equal to or greater than an exact reference value. Also, it is impossible to actually maintain the potency of manufactured syrup products at a certain level, and quantitative formulation into syrup preparations has not been achieved.

**Disclosure of Invention**

**Technical Problem**

The present invention has been designed to solve the problems as described above, and it is an object of the invention to provide a composition comprising an extract of *Pelargonium sidoides* and having a certain potency equal to or greater than an exact reference value, as a syrup preparation for the treatment of an acute or chronic infection.

**Technical Solution**

The composition for the treatment of an acute or chronic infection of the present invention is characterized by comprising, in addition to 100.00 parts by weight of a *Pelargonium sidoides* extract and 117 to 217 parts by weight of purified water, 285 to 530 parts by weight of a D-sorbitol/D-mannitol solution (Korean Pharmacopoeia) or a 0.01 to 0.1 M aqueous solution of D-sorbitol.

Furthermore, the composition preferably further comprises 0.48 to 0.89 parts by weight of a preservative, 0.04 to 0.08 parts by weight of a colorant, 2.52 to 4.67 parts by weight of a flavoring agent, or 1.63 to 3.03 parts by weight of a pH adjusting agent, per 100.00 parts by weight of the *Pelargonium sidoides* extract.

The preservative may be potassium sorbate.

The colorant may be a disodium salt of 6-hydroxy-5-[(2-methoxy-5-methyl-4-sulfophenyl)azo]-2-naphthalenesulfonyl acid.

The flavoring agent may be a cherry extract or menthol extract.

The pH adjusting agent may be citric acid.
The composition preferably has a pH of 2.5 to 4.5.

The total phenol content in terms of epicatechin in the composition is preferably 0.06 to 0.5 parts by weight per 100 parts by weight of the *Pelargonium sidoides* extract.

The *Pelargonium sidoides* extract is preferably an extract of the roots of *Pelargonium sidoides*.

The *Pelargonium sidoides* extract can be extracted with a solvent selected from the group consisting of water, methanol, ethanol, propanol, butanol and mixtures thereof.

The total phenol content in terms of epicatechin in the composition preferably comprises the following steps:

(A) preparing a test solution by mixing 1 part by weight of a *Pelargonium sidoides* extract with 40 to 60 parts by weight of a 15 to 30 wt% aqueous ethanol solution, 6 to 9 parts by weight of Folin Ciocalteus phenol reagent, 40 to 60 parts by weight of a 10 to 20 wt% aqueous solution of sodium carbonate, and 15 to 40 parts by weight of water, centrifuging the mixture solution, and taking the supernatant as the test solution;

(B) preparing a standard solution by mixing 1 part by weight of an aqueous ethanol solution of epicatechin with 8 to 12 parts by weight of a 15 to 30 wt% aqueous ethanol solution, 1 to 2 parts by weight of Folin Ciocalteus phenol reagent, 8 to 12 parts by weight of a 10 to 20 wt% aqueous solution of sodium carbonate, and 3 to 8 parts by weight of water, centrifuging the mixture solution, and taking the supernatant as the standard solution;

(C) measuring the absorbance of the test solution and the standard solution, while using water as a control; and

(D) calculating the total phenol content in terms of epicatechin by the following math figure 1:

\[
\frac{E_t \times S}{E_s \times V \times 200} \times 10^6
\]

wherein Et is the absorbance of the test solution,

Es is the absorbance of the standard solution,

V is the volume of the test solution measured in ml,

S is the mass of the standard solution measured in mg.

A step of leaving the mixture solution to stand at normal temperature for 10 to 30 minutes before centrifuging the mixture solution, may also be additionally included.
The centrifuging is preferably performed for 5 to 20 minutes.
The absorbance is preferably measured at 720 nm.
The 15 to 30 wt% aqueous ethanol solution is preferably prepared by diluting a 95 to 96 wt% aqueous ethanol solution with water at a volume ratio of 1:2 to 5.
The infection may be infection in the upper airway.
The infection may be infection in the respiratory system or in otorhinolaryngeal areas.
The infection may be bronchitis, sinusitis, tonsillitis or rhinopharyngitis.
The dosage form of the therapeutic composition is preferably a syrup preparation.

Advantageous Effects
The syrup containing a Pelargonium sidoides extract of the present invention can dramatically improve bitter taste and unpleasant odor of the drug compared to the conventional liquid preparations of Pelargonium sidoides extract. Thus, patients’ compliance to the drug is enhanced, and the drug can be easily administered to children or seniors.

Since the present invention provides a content analysis method for the Pelargonium sidoides extract which is responsible for the manifestation of efficacy, a syrup having a potency equal to or greater than an exact reference value can be produced, and also, it is now possible to actually maintain the potency of manufactured syrup products at a certain level, thus quantitative formulation into syrup preparation being achieved.

Moreover, the quantitative analysis method for Pelargonium sidoides extract of the present invention enables content measurement in a syrup containing the Pelargonium sidoides extract, and the analysis method has an advantage of exhibiting excellent reproducibility and high reliability through relatively simple operations.

Brief Description of the Drawings
Fig. 1 is a graph showing the relationship between the concentration of a Pelargonium sidoides extract and the absorbance.

Best Mode for Carrying Out the Invention
Hereinafter, preferred embodiments of the present invention will be described in detail. In the following description, a number of specific matters such as specific constituent elements are disclosed, but it will be obvious to those having ordinary skill in the related art that these matters are provided only for the purpose of helping in more general understanding of the present invention, and the present invention can be carried out without these specific matters. Further, in describing the present invention,
when it is judged that specific descriptions on related known functions or constitutions may unnecessarily make the gist of the invention ambiguous, the detailed description will be omitted.

[47] The *Pelargonium sidoides* extract-containing syrup for the treatment of an acute or chronic infection of the present invention includes, in addition to 100 parts by weight of a *Pelargonium sidoides* extract and 117 to 217 parts by weight of purified water, 285 to 530 parts by weight of a D-sorbitol/D-mannitol solution (Korean Pharmacopoeia) or a 0.01 to 0.1 M aqueous solution of D-sorbitol.

[48] It can be said that a first feature of the syrup composition of the present invention is the use of a D-sorbitol/D-mannitol solution (Korean Pharmacopoeia) or an aqueous solution of D-sorbitol as a sweetening agent.

[49] Fructose or sugar which has been conventionally used as a sweetening agent for the manufacture of syrup, exerts influence on the quantitative analysis of *Pelargonium sidoides* that will be described later. Specifically, the content of the *Pelargonium sidoides* extract, which is the main active ingredient of the syrup of the present invention, is measured as the total phenol content in terms of epicatechin. However, said fructose or sugar absorbs the same wavelength, thus exerting influence on the absorbance, and making the measurement of the total phenol content impossible. Therefore, application thereof to the present invention is inadequate.

[50] The inventors of the present invention extensively searched for new sweetening agents that can replace fructose or sugar, and as a result, they discovered that D-sorbitol does not absorb the above-mentioned wavelength. Furthermore, it was confirmed that a D-sorbitol/D-mannitol solution (Korean Pharmacopoeia), which is a mixture with a small amount of D-mannitol, also virtually does not absorb the said wavelength, and thus the solution was employed as a sweetening agent for the present invention.

[51] The content of such sweetening agent of the present invention is preferably 285 to 530 parts by weight per 100 parts by weight of the *Pelargonium sidoides* extract. If the content is less than 285 parts by weight, insufficient sweet taste may significantly reduce the degree of preference in infants and children. If the content exceeds 530 parts by weight, the overly sweet taste may rather lower the degree of preference.

[52] The present invention additionally includes various components in addition to the sweetening agent, and may include 0.48 to 0.89 parts by weight of a preservative, 0.04 to 0.08 parts by weight of a colorant, 2.52 to 4.67 parts by weight of a flavoring agent, or 1.63 to 3.03 parts by weight of a pH adjusting agent.
[53] The preservative is added to prevent microbial contamination in the syrup of the present invention, and potassium sorbate which does not have influence on the analysis of *Pelargonium sidoides* extract, as discussed in the case of fructose or sugar as the sweetening agent, and also has excellent stability, is preferred. The amount of addition of potassium sorbate is preferably 0.48 to 0.89 parts by weight per 100 parts by weight of a *Pelargonium sidoides* extract, and if the amount is less than 0.48 parts by weight, the syrup of the present invention may become possibly contaminated, while if the amount is more than 0.89 parts by weight, unexpected side effects may occur in the human body.

[54] In order to increase the degree of preference visually and olfactorily, it is preferable to add 0.04 to 0.08 parts by weight of a colorant and 2.52 to 4.67 parts by weight of a flavoring agent. In the present invention, it is preferable to use a disodium salt of 6-hydroxy-5-[(2-methoxy-5-methyl-4-sulfophenyl)azo]-2-naphthalenesulfonic acid (Korea Food and Drug Administration Notification No. 2000-66, Red No. 40) as the colorant, and to use a cherry extract or menthol extract as the flavoring agent.

[55] It is also preferable that the syrup composition for the treatment of infection of the present invention additionally include 1.63 to 3.03 parts by weight of a pH adjusting agent. Since the *Pelargonium sidoides* extract used as a traditional medicine has an acidic pH, it is preferable to adjust the pH of the syrup of the present invention to be also acidic, and particularly, a pH of 2.5 to 4.5 is preferred. The pH adjusting agent used in the present invention is more preferably citric acid, which does not have influence on the analysis of the *Pelargonium sidoides* extract.

[56] The *Pelargonium sidoides* extract is more preferably an extract of the roots of *Pelargonium sidoides*, and the extracting solvent is preferably selected from water, methanol, ethanol, propanol, butanol and mixtures thereof.

[57] Meanwhile, the syrup composition of the present invention requires a quantitative analysis method which is directly correlated to the potency of the *Pelargonium sidoides* extract, which is the pharmaceutical component of the composition, so as to manage the potency of the extract to be equal to or higher than an exact level, and to induce reproducible results. Thus, it is another important feature that the present invention is characterized by such a quantitative analysis method.

[58] The quantitative analysis method for *Pelargonium sidoides* extract first starts with a step of preparing a test solution containing a *Pelargonium sidoides* extract, and a standard solution as the base to be compared with the test solution.

[59] First of all, the *Pelargonium sidoides* extract to be analyzed may be any material
containing a Pelargonium sidoides extract, regardless of the dosage form, and according to the present invention, a syrup preparation containing the extract is more preferred.

1 part by weight of said extract is mixed with 40 to 60 parts by weight of a 15 to 30 wt% aqueous ethanol solution, 6 to 9 parts by weight of Folin Ciocalteus phenol reagent, 40 to 60 parts by weight of a 10 to 20 wt% aqueous solution of sodium carbonate, and 15 to 40 parts by weight of water.

Here, the 15 to 30 wt% aqueous ethanol solution is preferably prepared by diluting a 95 to 96 wt% aqueous ethanol solution with water at a volume ratio of 1:2 to 5.

The mixture solution is subsequently centrifuged, and then the supernatant is taken as the test solution.

At this time, the centrifuging is preferably performed for 5 to 20 minutes.

In particular, in the present invention, it is more preferable that a step of leaving the mixture solution to stand at normal temperature for 10 to 30 minutes before centrifuging the solution, be additionally included from the viewpoint of enhancing the reproducibility of the analysis results.

Apart from the test solution, an epicatechin standard solution is prepared. First, 1 part by weight of an aqueous ethanol solution of epicatechin prepared by appropriately diluting epicatechin with the above-described 15 to 30 wt% aqueous ethanol solution, is mixed with 8 to 12 parts by weight of the 15 to 30 wt% aqueous ethanol solution, 1 to 2 parts by weight of Folin Ciocalteus phenol reagent, 8 to 12 parts by weight of a 10 to 20 wt% aqueous solution of sodium carbonate, and 3 to 8 parts by weight of water.

Hereinafter, the step of leaving to stand and the step of centrifuging are identical to those in the step of preparing a test solution.

Subsequently, the test solution and standard solution prepared as described above are subjected to measurement of the absorbance, using water as a control. The measurement is most preferably conducted at a wavelength of 720 nm.

Finally, the content of Pelargonium sidoides is determined by calculating the total phenol content in terms of epicatechin, by the following math figure 1.

\[
\frac{E_t \times S}{E_s \times V \times 200} \times 100
\]

wherein \(E_t\) is the absorbance of the test solution,

\(E_s\) is the absorbance of the standard solution,
V is the volume of the test solution measured in ml, and
S is the mass of the standard solution measured in mg.

It is preferable for the syrup composition of the present invention that the total
phenol content in terms of epicatechin thus measured be 0.001 to 0.1 parts by weight
per 100 parts by weight of the syrup composition. If the total phenol content is less
than 0.01 parts by weight, the treatment of infection may not be satisfactorily achieved,
while if the total phenol content is greater than 0.1 parts by weight, there is a dis-
advantage that the economic efficiency becomes poor compared to the degree of mani-
festation of the efficacy.

Hereinafter, Examples of the present invention will be described.

Mode for the Invention

Example 1: Preparation of *Pelargonium sidoides* extract

100 g of dried roots of *Pelargonium sidoides* was cut to small pieces (95% or more
being 1 cm or less in size), and then was wetted with 200 ml of a 35 wt% aqueous
ethanol solution. Then, 800 ml of a 5.3 wt% aqueous ethanol solution was added
thereto to perform extraction. The obtained residue was pressed again, and the
resulting liquid was mixed with the previously obtained extract, and the mixture was
filtered and heated at 118 to 122°C for 5 to 30 seconds, to thus obtain the *Pelargonium sidoides*
extract of the present invention.

Example 2: Preparation of syrup

To a 250-ml* vessel, 17.16 g of the *Pelargonium sidoides* extract of Example 1, 70.00
g of a D-sorbitol/D-mannitol solution (Korean Pharmacopoeia), 0.117 g of potassium
sorbate, 0.010 g of a disodium salt of
6-hydroxy-5-[(2-methoxy-5-methyl-4-sulfophenyl)azo]-2-naphthalenesulfonic acid
(Korea Food and Drug Administration Notification No. 2000-66, Red No. 40), 0.7 ml
of cherry essence (Seoul N.C.P.), and 0.400 g of citric acid were added and mixed, and
purified water was added to a volume of 100 ml, to thus prepare the syrup of the
present invention.

Example 3: Preparation of test solution

200 ml of the syrup of Example 2, 10 ml of an ethanol dilution prepared by mixing
and diluting a 96 wt% of aqueous ethanol solution with purified water at 1:3, 1.5 ml of
Folin Ciocalteus phenol reagent, and 10 ml of an aqueous solution of sodium carbonate
were precisely weighed in a flask having a capacity of 25 ml, and purified water was
added thereto to a total volume of 25 ml. This mixture solution was left to stand at
normal temperature for 20 minutes, and then was centrifuged for 10 minutes. The su-
pernatant was taken as the test solution.

Example 4: Preparation of standard solution

10 mg of epicatechin was precisely weighed and introduced into a flask having a capacity of 20 ml, and an ethanol dilution prepared by mixing and diluting a 96 wt% aqueous solution of ethanol with purified water at 1:3 was added thereto to a total volume of 20 ml. 1 ml of the solution was taken, and the above-mentioned ethanol dilution was added again thereto to a total volume of 10 ml. Then, another 1 ml was taken therefrom. 1 ml of the finally taken solution, 10 ml of the ethanol dilution, 1.5 ml of Folin Ciocalteus phenol reagent, and 10 ml of an aqueous solution of sodium carbonate were precisely weighed in a flask having a capacity of 25 ml, and purified water was added thereto to a total volume of 25 ml. This mixture solution was left to stand at normal temperature for 20 minutes, and then centrifuged for 10 minutes. The supernatant was taken as the standard solution.

Example 5: Measurement of absorbance

The test solution from Example 3 and the standard solution from Example 4 were subjected to the measurement of absorbance (Agilent, Inc., Model 8453) at 720 nm, with a total path length of 10 mm, using water as a control.

As a result of the measurement, the syrup of Example 2 was found to have a total phenol content in terms of epicatechin of 25.6 mg on the average, and thus it was confirmed that the syrup satisfied the criterion of total phenol content of the present invention.

Test Example: Toxicity test

In order to examine the acute toxic effects of the Pelargonium sidoides extract of Example 1, the extract was orally administered to rats while varying the dose. As a result, at 10 and 20 mg/kg, no general changes in the state were observed, but at 30 mg/kg, the rats showed a decrease in the mobility and reaction to coordination disorder. At 40 mg/kg, the experimental animals fell within 10 to 15 minutes after the occurrence of drowsiness, but after 2 to 4 hours, the animals recovered from an unconscious state. At 45 to 50 mg/kg, first death occurred, and the surviving rest animals were confirmed to recover after 12 to 14 hours. The LD₅₀ of the extract of Example 1 was investigated to be 48.5 mg/kg.

The syrup of the present invention containing a Pelargonium sidoides extract as the main material utilizes the Pelargonium sidoides extract which has been hitherto used for long as a traditional drug, as the main material, and is prepared by mixing those additives suggested by the pharmacopoeia for use in syrup, with the extract. Therefore,
it is a matter of fact that the pharmaceutical effects of the syrup are also the same as those of the original *Pelargonium sidoides* extract.

As discussed above, preferred embodiments of the present invention have been illustrated and explained, but the present invention is not intended to be limited to the above-described specific embodiments, and any person having ordinary skill in the pertinent art can definitely carry out various modifications without departing from the gist of the present invention. Therefore, the scope of the present invention should not be interpreted to be limited to the above Examples, and should be determined by the claims that will be described below as well as equivalents to these claims.
Claims

[1] A composition for the treatment of an acute or chronic infection comprising, in addition to 100 parts by weight of a *Pelargonium sidoides* extract and 117 to 217 parts by weight of purified water, 285 to 530 parts by weight of a D-sorbitol/D-mannitol solution (Korean Pharmacopoeia) or a 0.01 to 0.1 M aqueous solution of D-sorbitol.

[2] The composition for the treatment of an acute or chronic infection according to claim 1, further comprising 0.48 to 0.89 parts by weight of a preservative, 0.04 to 0.08 parts by weight of a colorant, 2.52 to 4.67 parts by weight of a flavoring agent, or 1.63 to 3.03 parts by weight of a pH adjusting agent, per 100.00 parts by weight of the *Pelargonium sidoides* extract.

[3] The composition for the treatment of an acute or chronic infection according to claim 2, wherein the preservative is potassium sorbate.

[4] The composition for the treatment of an acute or chronic infection according to claim 2, wherein the colorant is a disodium salt of 6-hydroxy-5-[(2-methoxy-5-methyl-4-sulfophenyl)azo]-2-naphthalenesulfonic acid.

[5] The composition for the treatment of an acute or chronic infection according to claim 2, wherein the flavoring agent may be a cherry extract or menthol extract.

[6] The composition for the treatment of an acute or chronic infection according to claim 2, wherein the pH adjusting agent is citric acid.

[7] The composition for the treatment of an acute or chronic infection according to claim 1, wherein the composition has a pH of 2.5 to 4.5.

[8] The composition for the treatment of an acute or chronic infection according to claim 1, wherein the total phenol content in terms of epicatechin in the composition is 0.01 to 0.1 parts by weight per 100 parts by weight of the composition.

[9] The composition for the treatment of an acute or chronic infection according to claim 1, wherein the *Pelargonium sidoides* extract is an extract of the roots of *Pelargonium sidoides*.

[10] The composition for the treatment of an acute or chronic infection according to claim 1, wherein the *Pelargonium sidoides* extract is extracted with a solvent selected from the group consisting of water, methanol, ethanol, propanol, butanol and mixtures thereof.
[11] The composition for the treatment of an acute or chronic infection according to claim 8, wherein the total phenol content in terms of epicatechin in the composition is analyzed by the following steps:

(A) preparing a test solution by mixing 1 part by weight of a *Pelargonium sidoides* extract with 40 to 60 parts by weight of a 15 to 30 wt% aqueous ethanol solution, 6 to 9 parts by weight of Folin Ciocalteus phenol reagent, 40 to 60 parts by weight of a 10 to 20 wt% aqueous solution of sodium carbonate, and 15 to 40 parts by weight of water, centrifuging the mixture solution, and taking the supernatant as the test solution;

(B) preparing a standard solution by mixing 1 part by weight of an aqueous ethanol solution of epicatechin with 8 to 12 parts by weight of a 15 to 30 wt% aqueous ethanol solution, 1 to 2 parts by weight of Folin Ciocalteus phenol reagent, 8 to 12 parts by weight of a 10 to 20 wt% aqueous solution of sodium carbonate, and 3 to 8 parts by weight of water, centrifuging the mixture solution, and taking the supernatant as the standard solution;

(C) measuring the absorbance of the test solution and the standard solution, while using water as a control; and

(D) calculating the total phenol content in terms of epicatechin by the following math figure 1:

[Math Figure 1]

\[
\frac{E_t \times S}{E_s \times V \times 200} \times 100
\]

wherein \( E_t \) is the absorbance of the test solution,

\( E_s \) is the absorbance of the standard solution,

\( V \) is the volume of the test solution measured in ml,

\( S \) is the mass of the standard solution measured in mg.

[12] The composition for the treatment of an acute or chronic infection according to claim 11, further comprising a step of leaving the mixture solution to stand at normal temperature for 10 to 30 minutes before centrifuging the mixture solution.

[13] The composition for the treatment of an acute or chronic infection according to claim 11, wherein the centrifuging is performed for 5 to 20 minutes.

[14] The composition for the treatment of an acute or chronic infection according to claim 11, wherein the absorbance is measured at 720 nm.
[15] The composition for the treatment of an acute or chronic infection according to claim 11, wherein the 15 to 30 wt% aqueous ethanol solution is prepared by diluting a 95 to 96 wt% aqueous ethanol solution with water at a volume ratio of 1:2 to 5.

[16] The composition for the treatment of an acute or chronic infection according to any one of claims 1 to 15, wherein the infection is infection in the upper airway.

[17] The composition for the treatment of an acute or chronic infection according to any one of claims 1 to 15, wherein the infection is infection in the respiratory system or in otorhinolaryngeal areas.

[18] The composition for the treatment of an acute or chronic infection according to any one of claims 1 to 15, wherein the infection is bronchitis, sinusitis, tonsillitis or rhinopharyngitis.
A. CLASSIFICATION OF SUBJECT MATTER

**A61K 36/185(2006.01)**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKIPASS, STN (Caplus), Pubmed

* Key words  Pelargonium sidoides, infection, composition, mannnitol, sorbitol

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No</th>
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<tr>
<td>X</td>
<td>WO 2003/028746 A1 (ISO ARZNEIMITTEL GMBH &amp; CO KG ) 10 April 2003 See the abstract, examples and claims</td>
<td>I - 18</td>
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<tr>
<td>X</td>
<td>WO 2006/002918 A3 (BIOPLANTA ARZNEIMITTEL GMBH) 12 January 2006 See the claims 6 and 9</td>
<td>I - 18</td>
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<tr>
<td>X</td>
<td>US 2006/0263448 A1 (ISO ARZNEIMITTEL GMBH &amp; CO KG ) 23 November 2006 See the abstract, examples and claims</td>
<td>I - 18</td>
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☐ Further documents are listed in the continuation of Box C  ☑ See patent family annex

* Special categories of cited documents
  
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