COMPOSITION OF A DIETARY SUPPLEMENT AND/OR A NUTRITIONAL ADDITIVE FOR FOOD, A UNITARY DOSAGE FORM OF SAID COMPOSITION, AND THEIR USE FOR IMPROVEMENT OF THE QUALITY OF VISUAL PERFORMANCE INCLUDING CONTRAST SENSITIVITY IN PERSONS IN NEED OF SUCH AN IMPROVEMENT, INCLUDING PERSONS SUFFERING FROM AT LEAST ONE EYE DISEASE, PARTICULARLY VITREOUS FLOATERS

Description

Field of the invention

The invention concerns a composition of a dietary supplement and/or a nutritional additive for food comprising as active substances L-lysine, vitamin C, zinc, grape extract and bitter orange extract in therapeutically effective quantities according to claim 1.

The subject-matter of the invention is also a unitary dosage form comprising said composition of the dietary supplement and/or the nutritional additive for food.

The subject-matter of the invention is, furthermore, a use of the above-mentioned composition and unitary dosage form for improvement of the quality of visual performance including contrast sensitivity in persons in need of such an improvement and for improvement of the quality of life of these persons, including persons, which were diagnosed to suffer from at least one eye disease, and in particular from vitreous floaters.

Background of the invention

In the state of the art, there are several known dietary supplements, which comprise combinations of various ingredients, for use in eye diseases.

The studies conducted in recent decades indicate a positive impact of nutritional factors in the prevention and treatment of eye diseases. Among the best-known effects nowadays, there is the effect of L-lutein and zeaxanthin, natural carotenoids, which are ingredients contained in many food products of plant origin, in the prevention and treatment of the age-related macular disease (AMD or ARMD). As studies show, lutein and zeaxanthin form part of the macular pigment, which protects the macula lutea from the negative impact of light, in particular of the highly energetic ultraviolet radiation.

Patent specification EP 2883544 B1 informs that the oral application of the dietary supplement in the form of a preparation comprising lutein, zeaxanthin along with other nutritional ingredients supports the increase of the optical density of the macular pigment (MPOD), may protect the eye retina from the negative impact of light radiation, and may inhibit the development of the age-related macular disease, AMD.

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In the light of the ever-increasing importance of eye diseases including the vitreous floaters disease, the inventors of the present invention have also noticed the need to develop a composition of a dietary supplement meant for persons suffering from eye diseases, and in particular for persons suffering from vitreous floaters, to treat these diseases, to slow down their development or to inhibit them, and to prevent their appearance.

Because vitreous floaters are nowadays a very common issue, the inventors of the present invention have launched research aiming at development of a composition of a dietary supplement and its dosage regime which would ensure improving the subjective assessment of the quality of life in persons with eye diseases, and in particular in persons with vitreous floaters, as well as improving the quality of visual performance in these persons measured by objective study methods.

These aims were reached with the composition of the dietary supplement according to the present invention, whereas it has unexpectedly turned out that simultaneous inclusion in the composition of L-lysine, vitamin C, zinc, the grape extract and the bitter orange extract significantly improves the subjective assessment of the quality of life in persons suffering from vitreous floaters, and the objective assessment of the quality of visual performance measured with the contrast sensitivity.

Summary of the present invention

A composition of a dietary supplement and/or nutritional additive for food according to the present invention contains as active substances L-lysine, vitamin C, zinc, grape extract and bitter orange extract in therapeutically effective quantities, and potentially at least one excipient.

The percentages of individual active substances of the composition relative to a sum of percentages of all active substances are:

a) about 50% by weight of L-lysine,

b) about 15% by weight of vitamin C,

c) about 2% by weight of zinc,

d) about 10% by weight of the grape extract,

e) about 23% by weight of the bitter orange extract,

with all percentages of the individual active substances adding up to 100% by weight of all active substances.

Preferably, the composition contains:

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hamper the glycation of collagen fibres and decrease the activity of enzymes responsible for collagen disintegration, that is L-lysine, the grape extract and the bitter orange extract.

L-lysine is an essential amino acid, which needs to be obtained from food as the human organism cannot produce it, and which among others supports the creation of collagen. L-lysine is the free form of this essential amino acid and is absorbed directly into the bloodstream.

The extracts from grapes and bitter orange contain great quantities of biologically active chemical compounds called oligomeric proanthocyanidin complexes or oligomeric proanthocyanidins (OPC), which are commonly known as "super antioxidants" due to their strong antioxidant properties and properties of hampering activity of proteases breaking collagen fibres.

Proanthocyanidins are known also as bioflavonoids and contain hesperidin in high concentrations, which has, apart from antioxidant properties, also anti-inflammatory and protective properties on blood vessels, thereby improving the state of capillaries as well as decreasing their permeability.

In the preferred embodiment of the composition according to the present invention, for the grape extract a grape extract of the *Vitis Vinifera* species was chosen and for the bitter orange extract a bitter orange extract of the *Citrus Aurantium* species.

The formulations of the composition according to the present invention in the form of the powder or the granulate or the liquid or the gel subsequently serve to produce the unitary dosage form.

Preferably, various forms of the formulation of the composition according to the present invention are placed in the casing or the sheath to obtain the unitary dosage form in the form of the capsule for instance.

After the selection of the active substances for the ingredients of the composition, the inventors matched the percentages by weight of the individual active substances relative to the sum of the percentages by weight of all five active substances, taking into account the guidelines concerning the quantity of the individual active substances for dietary supplements and doses of dietary supplements, which quantities have to reflect the content of the individual active substances in natural or food products and cannot exceed the acceptable quantities and doses for a dietary supplement.

Then, the powdered active substances in the respective percentages by weight were used to prepare the mixture, which was closed in the unitary dosage form in the form of the capsule. One capsule contained 125 mg of L-lysine, 40 mg of vitamin C, 5 mg of zinc, 25

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Without changes	13	14
Improvement	7	14
Deterioration	6	2

Impact of vitreous floaters on certain activities in the control and active groups after 6 months of supplementation

The impact of vitreous floaters on certain activities: reading small letters (drugs or cosmetics information leaflets), reading newspapers or books, driving a car during the day, using a computer or a mobile phone, watching TV was assessed before the commencement of the study at the baseline visit and after the end of the study at the final visit by subjects responding with either “Yes” or “No” to each activity. A “Yes” response for a certain activity meant disturbances caused by vitreous floaters during this activity. A positive response was scored 1, a negative 0. An overall activity score was calculated by summing up and averaging the individual activity scores reported by each participant of the study. The median overall activity score was determined for each tested group at the baseline and final visits, compared between the groups and within the groups pre and post supplementation.

At baseline, the median overall activity scores (IQR) were 0.40 (0.10 – 0.80) and 0.60 (0.30 – 0.80) for the control and active groups (p = 0.104), respectively. Following supplementation, the median overall activity scores were 0.20 (0.00 – 0.50) and 0.20 (0.00 – 0.60) for the control and active groups (p = 0.619), respectively. Comparing the baseline and final overall activity scores within both groups, there was a statistically significant difference (p = 0.007) in median overall activity score for the active group after 6 months of supplementation, with a lesser score recorded at the final visit (where the lesser score indicates less activities affected by floaters). The difference observed in the control group was, on the other hand, not statistically significant (p = 0.064).

Subjective severity of floater disturbances categorized by age, sex or PVD status, before and after supplementation in the active group

To assess the influence of demographic factors on the application of the supplementation, the active group was stratified by age, sex and posterior vitreous detachment (PVD) status.

With a median age of 56.5 years, the participants of the study were divided into two age groups: 55 years and below (n = 12), and beyond 55 years (n = 18), and the severity of their floater disturbances in the groups were compared before and after supplementation.

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to the present invention significantly improves the subjective assessment of the quality of life in persons suffering from vitreous floaters.

Simultaneously, after the 6-month supplementation period with the composition according to the present invention, there has been observed the clearly detectable and significant improvement of the quality of visual performance in these patients through the significant improvement of the contrast sensitivity.

The present invention provides the composition of nutritional substances for oral administration, which positively impacts the quality of vision and contrast sensitivity in persons suffering from vitreous floaters.

Simultaneously, basing on the general knowledge and experience in pathomechanisms, the course and development of various eye diseases, and the knowledge on the properties of the active substances used in the composition according to the present invention, and basing on the studies conducted for the purpose of the present invention and described above, which related to persons suffering from vitreous floaters, it is claimed that the developed composition and the unitary dosage form according to the present invention are suitable to provide a similar positive therapeutic effect and be used also in treating other different eye diseases and/or slowing down their development and/or inhibiting their development and/or preventing them, as well as, more generally, to be used with the aim to improve the quality of visual performance including contrast sensitivity in all persons in need of such an improvement, and with the aim to improve the quality of life of these persons.

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CLAIMS

1. A composition of a dietary supplement and/or nutritional additive for food comprising L-lysine, vitamin C, zinc, grape extract and bitter orange extract in therapeutically effective quantities as active substances, and potentially at least one excipient, wherein percentages of the individual active substances relative to a sum of percentages of all active substances are:

a) about 50% by weight of L-lysine,

b) about 15% by weight of vitamin C,

c) about 2% by weight of zinc,

d) about 10% by weight of the grape extract,

e) about 23% by weight of the bitter orange extract,

with all percentages of the individual active substances adding up to 100% by weight of all active substances.

2. The composition according to claim 1, characterised in that it contains:

a) from 125 mg to 250 mg of L-lysine,

b) from 40 mg to 80 mg of vitamin C,

c) from 5 mg to 10 mg of zinc,

d) from 25 mg to 50 mg of the grape extract,

e) from 60 mg to 120 mg of the bitter orange extract.

3. The composition according to any of claims 1 or 2, characterised in that its ingredients constitute a mixture.

4. The composition according to any of claims 1 to 3, characterised in that the grape extract and/or the bitter orange extract are selected from the group comprising the extract of fruit seeds, the extract of fruit pulp, the extract of fruit skin, the extract of blossoms of these plants, or their combinations.

5. The composition according to any of claims 1 to 4, characterised in that the grape extract is a grape extract of the *Vitis Vinifera* species and/or the bitter orange extract is a bitter orange extract of *Citrus Aurantium* species, preferably, both extracts DER 100:1 ("DER" means drug extract ratio, which is a ratio of the quantity of the plant raw material used for producing the plant extract to the quantity of the obtained plant extract).

6. The composition according to any of claims 1 to 5, characterised in that the excipient is a substance nutritionally permitted and is selected from the group comprising at least a vehicle

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agent, a bulking agent, a binding agent, a disintegrant, a surfactant, a lubricant, an anti-caking agent, an acidity regulator, an antioxidant, a synthetic and/or natural colourant, a colour retaining substance, an emulsifier, a sweetener, an aromatizing agent, a flavouring agent, a flavour enhancer, a preservative, a stabilizing agent, a solvent and a diluent, or their mixtures.

7. The composition according to any of claims 1 to 6, characterised in that it has a form of any formulation adequate for oral application such as a powder or a granulate or a liquid or a gel.

8. The composition according to any of claims 1 to 7, characterised in that it is applied in a preferred dose, frequency and a form for a period of at least 2 months, preferably for a period of at least 3 months and more preferably for a period of at least 6 months.

9. The composition according to any of claims 1 to 8, characterised in that it has a form of a unitary dosage form.

10. The composition according to claim 9, characterised in that the unitary dosage form contains a daily dose of active substances of the present composition.

11. The composition according to claim 9 or 10, characterised in that the unitary dosage form is further prepared in a form selected from the group comprising at least a capsule, a tablet, a sachet, a "stick-type" sachet and an ampoule, including any of these forms ensuring a prolonged release of the active substances of the composition in time of at least 3 hours after consumption.

12. A composition of a dietary supplement and/or nutritional additive for food according to any of claims 1 to 11 for use with the objective to improve quality of visual performance including contrast sensitivity in persons in need of such an improvement and with the objective to improve quality of life of these persons.

13. A composition of a dietary supplement and/or nutritional additive for food according to any of claims 1 to 11 for use in treating eye diseases and/or slowing down development of eye diseases and/or inhibiting development of eye diseases and/or preventing these eye diseases, wherein the eye diseases are associated with a decline in quality of visual performance including contrast sensitivity.

14. The composition according to claim 12 and/or 13 for use in persons suffering from vitreous floaters.

15. Use of a composition of a dietary supplement and/or nutritional additive for food according to any of claims 1 to 11 in the manufacture of a medicament for treatment of eye

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diseases necessitating an improvement in the quality of visual performance including contrast sensitivity in persons and to improve quality of life of these persons.

16. Use of a composition of a dietary supplement and/or nutritional additive for food according to any of claims 1 to 11 in the manufacture of a medicament for treatment of eye diseases and/or slowing down development of eye diseases and/or inhibiting development of eye diseases and/or for prevention of these eye diseases, wherein the eye diseases are associated with a decline in quality of visual performance including contrast sensitivity in persons.

17. The use of the composition and/or nutritional additive according to claim 15 and/or 16, wherein said eye disease is vitreous floaters.

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