

Non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$

Technical Field

The present invention relates to non-alcoholic beverage production. More specifically, this invention relates to production of non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, in other words non-alcoholic beverage with increased $^1\text{H}_2^{16}\text{O}$ content in non-alcoholic beverage composition in comparison with typical non-alcoholic beverage composition.

Background of the Invention

The quality and purity of drinking water and water as a component in the composition of non-alcoholic beverages are one of determinative factors for life quality and human health.

Water as a chemical agent is a substance consisting of water molecules. However there is no absolutely pure natural water. The natural water always contains a quantity of different suspension particles, chemical and biological admixtures. I.e. any natural water (including any drinking water) is a composition of water as a chemical agent and some other substances.

The purification of water is a vital necessity today. Water purification methods depend on subsequent use of water and can be different, such as filtration, distillation, reverse osmosis and so on. The traditional water purification methods are able to eliminate only admixtures from water and have no effect on water as a chemical agent. I.e. they do not change the ratio between isotope varieties of water molecules.

The molecule of water H_2O consists of two chemical elements – hydrogen H and oxygen O. Either of two elements also consists of several isotopes.

Hereinafter:

the term «hydrogen» (lettering: H) means a chemical element as a total of stable nonradioactive hydrogen isotope varieties;

the term «oxygen» (lettering: O) means a chemical element as a total of stable nonradioactive oxygen isotope varieties;

5 the natural hydrogen consists of stable nonradioactive isotopes:

- protium (lettering ^1H);

- deuterium (lettering ^2H , historical symbol D, further can be used lettering ^2H or equivalent lettering D).

the natural oxygen consists of three stable nonradioactive isotopes:

10 - oxygen-16 (lettering ^{16}O),

- oxygen-17 (lettering ^{17}O),

- oxygen-18 (lettering ^{18}O),

(the present invention concerns the said stable nonradioactive isotopes only);

15 Any water as chemical agent is a composition of 9 isotope varieties of water molecule such as: $^1\text{H}_2^{16}\text{O}$, $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ formed by stable isotopes of hydrogen - ^1H , ^2H , and stable isotopes of oxygen - ^{16}O , ^{17}O , ^{18}O . The other name for these isotope varieties of water molecule is isotopologues.

20 The term «isotopologue» is defined in accordance with IUPAC Compendium of Chemical Terminology 2nd Edition (1997) and refers to a molecular entity that differs only in isotopic composition (number of isotopic substitutions), e.g. $^1\text{H}_2^{16}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}_2^{18}\text{O}$. Herein and after the terms «isotope variety of water molecule» and «isotopologue» are used as convertible terms.

25 The content of water isotopologues in Ocean Water is stated as the internationally accepted water standard VSMOW. In Ocean Water the level of

$^1\text{H}_2^{16}\text{O}$ molecules comprising light isotopes ^1H and ^{16}O is 99.731% (Vienna Standard Mean Ocean Water, VSMOW), and about 0.2683% of the Ocean Water is formed by water molecules comprising heavy isotopes ^2H , ^{17}O , ^{18}O (0.0372% $^1\text{H}_2^{17}\text{O}$, 0.199983% $^1\text{H}_2^{18}\text{O}$, 0.031069% $^1\text{H}^2\text{H}^{16}\text{O}$, and etc.) (Rothman et al., J. Quant. Spectrosc. Radiat. Transfer, 1998, 60, 665. Rothman et al., J. Quant. Spectrosc. Radiat. Transfer, 2003, 82, p.9). The abundance of water isotopologues in natural water varies depending on Earth regions and climate conditions and is typically expressed as the deviation, δ , relative to the VSMOW standard. The natural water with maximum content of light water isotopologue $^1\text{H}_2^{16}\text{O}$ was found in Antarctica (Standard Light Antarctic Precipitation, SLAP), wherein said δ -values of residual heavy isotopes are $\delta^2\text{H} = -415.5\text{‰}$, $\delta^{17}\text{O} = -28.1\text{‰}$, and $\delta^{18}\text{O} = -53.9\text{‰}$ that corresponds to the 99.757 % level of light water isotopologue $^1\text{H}_2^{16}\text{O}$ (R. van Trigt, Laser Spectrometry for Stable Isotope Analysis of Water Biomedical and Paleoclimatological Applications, 2002, Groningen: University Library Groningen, p. 50).

Thus, natural water with the abundance of light water isotopologue $^1\text{H}_2^{16}\text{O}$ more than 99.757% is not found in nature.

In natural water the residual concentration of the molecules, comprising ^2H , ^{17}O , ^{18}O heavy isotopes, such as $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ can amount to 2.97 g/l.

Since total levels of deuterium-comprising isotopologues in water is rather more 0.3 g/l (0.031%) (Rothman et al., J. Quant. Spectrosc. Radiat. Transfer, 1998, 60, 665. Rothman et al., J. Quant. Spectrosc. Radiat. Transfer, 2003, 82, p.9) a complete depletion of natural water of deuterium-comprising isotopologues provides water with the level of light water isotopologue $^1\text{H}_2^{16}\text{O}$ no more than 99.76%.

Thus, water with abundance of light water isotopologue $^1\text{H}_2^{16}\text{O}$ more than 99.76% is unknown from the art.

Method and apparatus for production of water with abundance of $^1\text{H}_2^{16}\text{O}$ light water isotopologue more than 99.76% are also unknown from the art.

5 Light and heavy water isotopologues differ appreciably in their physical properties. For example, there are the distinctions between the boiling-points, freezing-points, densities. It is well-documented that light and heavy water isotopologues have distinct properties in biological system and distinctly affect properties of substances in solutions, for example, the rate of biochemical
10 reactions; the enthalpy of association of several binding systems, including protein-carbohydrate, small molecule-small molecule, protein-peptide, and protein-nucleic acid; the thermodynamics (free-energy, enthalpy, entropy and heat-capacity changes) of a ligand binding; the enthalpy of protein unfolding; the thermodynamic stability and formation of functional structures of nucleic
15 acids (Chervenak et al. JACS, 1994, 116 (23): 10533-10539. Makhatadze et al., Nature Struct. Biol., 1995, 2 (10): 852-855. Connelly et al., PNAS, 1994, 91: 1964-1968. Cupane et al., Nucleic Acids Res. 1980, 8 (18): 4283-4303).

As mentioned above, in typical natural water the residual concentration of molecules, comprising ^2H , ^{17}O , ^{18}O heavy isotopes can amount to 2.97 g/l by
20 weight. In nature the less concentration of molecules, comprising ^2H , ^{17}O , ^{18}O heavy isotopes, was found in Antarctica and corresponds to the 99.757 % level of light water isotopologue $^1\text{H}_2^{16}\text{O}$.

Heavy isotopes-comprising molecules in mammal organism can lead to a change of normal biochemical processes and to a decrease of functional
25 resources of the organism.

There is the barest necessity to increase the content of light water molecules of $^1\text{H}_2^{16}\text{O}$ and to decrease the content $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ molecules in human organism, as a result there is the improvement of human wellness and life quality.

The content of isotope varieties of water molecule such as: $^1\text{H}_2^{16}\text{O}$, $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ in human organism directly depend on the content of said isotope varieties of water molecule in a non-alcoholic beverage and drinking water used by human.

A non-alcoholic beverage with abundance of light water isotopologue $^1\text{H}_2^{16}\text{O}$ more than 99.76% is unknown from the art.

A drinking water with abundance of light water isotopologue $^1\text{H}_2^{16}\text{O}$ more than 99.76% is unknown from the art.

It is an object of the present invention to provide a non-alcoholic beverage comprising water with abundance of light water isotopologue $^1\text{H}_2^{16}\text{O}$ more than 99.76%.

Herein and after, drinking water is one of the type of a non-alcoholic beverage.

Brief Description of the Drawings

FIG.1 is a schematic side view of an apparatus for the production of the water comprising from about 99.76% to about 99.99% of $^1\text{H}_2^{16}\text{O}$ by weight.

Summary

In one aspect, there is provided a non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is more than 99.76% to 99.9% by weight of water of said non-alcoholic beverage, comprising: A) a highly pure light water in an amount from 20% to 99.9% by weight of said non-alcoholic beverage, wherein the highly pure light water is a composition comprising from more than 99.76 % to 99.99% of $^1\text{H}_2^{16}\text{O}$ by weight of highly pure light water and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly; B) a typical water with typical content of $^1\text{H}_2^{16}\text{O}$ in an amount from 0 % to 80% by weight of said non-alcoholic beverage, wherein said water is a composition comprising from 99.731 molecular % to 99.757 molecular % of $^1\text{H}_2^{16}\text{O}$ and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly; and C) a physiologically acceptable component in an amount up to 100% by weight of said non-alcoholic beverage.

Disclosure of Invention

The present invention provides a non-alcoholic beverage enriched with $^1\text{H}_2\ ^{16}\text{O}$, wherein the content of $^1\text{H}_2\ ^{16}\text{O}$ is no less than 99.76% by weight of water of said non-alcoholic beverage, comprising:

A) a highly pure light water in an amount from about 20% to about 99.9% by weight of said non-alcoholic beverage, wherein the highly pure light water is a composition comprising from about 99.76 % to about 99.99% of $^1\text{H}_2^{16}\text{O}$ and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly;

B) a typical water with typical content of $^1\text{H}_2^{16}\text{O}$ in an amount from 0 % to about 80% by weight of said non-alcoholic beverage, wherein said water is a composition comprising from about 99.731 % to about 99.757 % of $^1\text{H}_2^{16}\text{O}$ and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly; and

C) a physiologically acceptable component in an amount up to 100% by weight of said non-alcoholic beverage.

Preferably, the present invention provides a non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is no less than 99.80 % by weight of water of said non-alcoholic beverage, comprising:

A) a highly pure light water in an amount from about 20% to about 99.9% by weight of said non-alcoholic beverage, wherein the highly pure light water is a composition comprising from about 99.80 % to about 99.99% of $^1\text{H}_2^{16}\text{O}$ and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly;

B) a typical water with typical content of $^1\text{H}_2^{16}\text{O}$ in an amount from 0 % to about 80% by weight of said non-alcoholic beverage, wherein said water is a composition comprising from about 99.731 % to about 99.757 % of $^1\text{H}_2^{16}\text{O}$ and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly; and

C) a physiologically acceptable component in an amount up to 100% by weight of said non-alcoholic beverage.

Herein and after the definitions, «water with abundance of light water isotopologue $^1\text{H}_2^{16}\text{O}$ more than 99.76%», «water with increased content $^1\text{H}_2^{16}\text{O}$ »
5 and «water enriched with $^1\text{H}_2^{16}\text{O}$ » are used as convertible terms.

Herein and after, the term “highly pure light water” refers to water comprising from about 99.76% to about 99.99% of the most light isotope variety of water molecules, lettering $^1\text{H}_2^{16}\text{O}$.

Herein and after the term «typical water» means any water with content of
10 $^1\text{H}_2^{16}\text{O}$ within the limits of VSMOW-SLAP standards, i.e. from about 99.731% to about 99.757 % by weight of water.

Further, the present invention provides a non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, wherein the highly pure light water is selected from the group comprising distilled water, deionized water, reverse osmosis water.

15 Further, the present invention provides a non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, wherein the typical water with typical content of $^1\text{H}_2^{16}\text{O}$ is selected from the group comprising drinking water, mineralized water, mineral water, distilled water, deionized water, reverse osmosis water.

Further, the present invention provides a non-alcoholic beverage enriched
20 with $^1\text{H}_2^{16}\text{O}$, wherein the physiologically acceptable component is at least one selected from the group comprising natural fruit juice, vegetable juice, berry juice, nectar, dry beverage composition, dietary fiber, food component.

Further, the present invention provides a non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, wherein the physiologically acceptable component is at least one
25 selected from the group comprising inorganic salt, mineral, nutrient, vitamin,

flavanol, anti-oxidant, flavouring, extract, essence, colorant, aromatizator, food acid, bracer, technological additive.

Further, the present invention provides a non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, wherein said non-alcoholic beverage is a drinking water selected from the group comprising table drinking water, mineralized water, mineral
5 water, mineral table water, treatment-prophylactic mineral water, mineral-medicinal water, baby drinking water and can be saturated with carbon dioxide.

Further, the present invention provides a non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, wherein said non-alcoholic beverage is a blended beverage
10 selected from the group comprising table beverage, beverage for special purpose, refreshing beverage, cool beverage, tonic, lemonade, non-alcoholic cocktail and can be saturated with carbon dioxide.

Further, the present invention provides the non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, wherein said non-alcoholic beverage is selected from the
15 group comprising juice, nectar, kissel, mors, tea, kvass, non-alcoholic beer and can be saturated with carbon dioxide.

The present invention is directed to non-alcoholic beverage compositions comprising:

- (A) a first component which is highly pure light water;
- 20 (B) a second component which is typical water; and
- (C) a third component which is a physiologically acceptable component.

First component (A) - highly pure light water

According to the present invention it is possible to produce water enriched with $^1\text{H}_2^{16}\text{O}$ in an amount more than 99.76 % and up to about 99.99%
25 by weight of water. Water can be purified not only of typical chemicals and admixtures, but also of molecules, such as: $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$,

$^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$, which can amount up to 2.97 g/l and are a kind of admixtures concerning main component of water, which is $^1\text{H}_2^{16}\text{O}$. As a result, the water becomes isotope homogenous substance consisting of $^1\text{H}_2^{16}\text{O}$ in an amount up to 99.99 %, in other words, light water. This light water is the
5 pure water to a greater extent than any other purified water with typical isotope composition, it is highly pure light water. Thus, one can reach a qualitatively new and higher level of the water purity.

Thus, highly pure light water is a composition comprising from about 99.76 % to about 99.99% of $^1\text{H}_2^{16}\text{O}$ and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$,
10 $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly.

For practicing the invention we offer a method and apparatus for production of highly pure light water.

Highly pure light water comprising more than 99.76 % of light isotopologue $^1\text{H}_2^{16}\text{O}$ is prepared by distillation of typical water with typical
15 content $^1\text{H}_2^{16}\text{O}$ with using the apparatus of FIG.1. It is prepared by methods providing simultaneous depletion from typical water of 8 isotope varieties of water molecules comprising heavy isotopes ^2H , ^{17}O , and ^{18}O such as: $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$.

The process of the distillation includes:

- 20 - evaporating natural water comprising $[\text{C}_1]$ of light isotopologue $^1\text{H}_2^{16}\text{O}$ in boiling (see FIG 1,1) to produce water vapor;
- supplying the water vapor to the bottom (2) of distillation column (3);
 - carrying out vapor-liquid contact between a descending liquid and an ascending vapor mainly on the surface of the contact device (4) (e.g. structured
25 or random packing) within the distillation column, simultaneously the liquid and the vapor flow in mutually opposite directions over the surface of the

contact device along the main flow direction which is the direction of the column axis;

- condensing water vapor with concentration of light isotopologue $^1\text{H}_2^{16}\text{O}$ [C_2] on condenser (5) installed on the top of the distillation column;

5 - collecting a part of condensate as condensed highly pure light water comprising the increased content (more than 99.76 %) of light isotopologue $^1\text{H}_2^{16}\text{O}$ [$C_2 > C_1$].

After respective treatment one can get highly pure light water which is distilled water, deionized water, reverse osmosis water, ultra-pure water, etc.

10 These types of water differ by concentration of chemical substances, but it always comprises more than 99.76% of light isotopologue $^1\text{H}_2^{16}\text{O}$.

There is a molecular spectroscopic method for direct determination of $^1\text{H}_2^{16}\text{O}$ content in samples. (Rothman et al., J. Quant. Spectrosc. Radiat. Transfer, 1998, 60, 665. Rothman et al., J. Quant. Spectrosc. Radiat. Transfer, 15 2003, 82, p.).

Then, the highly pure light water with increased content of light isotopologue $^1\text{H}_2^{16}\text{O}$ is used for manufacturing of the drinking water and non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$ in an amount no less than 99.76 % by weight of water.

20 In the present invention highly pure light water can amount from about 20% to about 99.9% by weight of non-alcoholic beverage composition.

Second component (B) - typical water.

Typical water is the water with content of $^1\text{H}_2^{16}\text{O}$ within the limits of VSMOW-SLAP standards, i.e. from about 99.731% to about 99.757 % by 25 weight of water. In other words typical water is a composition comprising from about 99.731 % to about 99.757 % of $^1\text{H}_2^{16}\text{O}$ and residual amounts of $^1\text{H}_2^{17}\text{O}$,

$^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly. Thus dm^3 of the water can include up to 2.97 g of the water molecules, comprising ^2H , ^{17}O , ^{18}O heavy isotopes.

This is a significant value, compared with the concentration of other typical components in natural water. For example, the total mineralization of water can amount from 0.2 to 1.0 g/l for table drinking water and more than 1.0 g/l for mineral water.

Typical water can be drinking water, mineralized water, mineral water, distilled water, deionized water, reverse osmosis water, etc. These types of water differ by concentration of chemical substances. But these types of water always have typical content of $^1\text{H}_2^{16}\text{O}$ from about 99.731% to about 99.757 % by weight of water.

In the present invention typical water can amount from 0 % to about 80% by weight of non-alcoholic beverage composition.

Third component (C) - physiologically acceptable component

Examples of physiologically acceptable component include, but are not limited to, natural fruit juice, vegetable juice, berry juice, nectar, dry beverage composition, dietary fiber, food component, inorganic salt, mineral, nutrient, vitamin, flavanol, anti-oxidant, flavouring, extract, essence, colorant, aromatizator, food acid, bracer, technological additive, etc. or mixture thereof.

Nonexclusive examples of natural fruit juice which can be used in the beverages of the present invention as a physiologically acceptable component, include apple juice, lemon juice, orange juice, grapefruit juice, etc. or mixture thereof.

Nonexclusive examples of natural vegetable juice which can be used in the beverages of the present invention as a physiologically acceptable component, include tomato juice, carrot juice, etc. or mixture thereof.

Nonexclusive examples of natural berry juice which can be used in the
5 beverages of the present invention as a physiologically acceptable component, include black-currant juice, cranberries juice, etc. or mixture thereof.

Nonexclusive examples of nectar which can be used in the beverages of the present invention as a physiologically acceptable component, include peach nectar, banana nectar, etc. or mixture thereof.

10 Nonexclusive examples of dry beverage composition which can be used in the beverages of the present invention as a physiologically acceptable component, include orange-flavored dry beverage mix, powdered pink lemonade beverage mix, etc. or mixture thereof.

Nonexclusive examples of water soluble dietary fiber which can be used
15 in the beverages of the present invention as a physiologically acceptable component, include pectin, gum, arabinogalactan, etc. or mixture thereof.

Food component used of the present invention as physiologically acceptable additive in non-alcoholic beverage composition means any food component usually used in ordinary non-alcoholic beverages in forms, which
20 are necessary for this. Nonexclusive examples of alcoholic beverage of the present invention comprising food components include milk beverage, juice beverage, non-alcoholic cocktail, etc.

Food component used of the present invention as physiologically acceptable component in non-alcoholic beverage composition means any food
25 component, for example, dairy produces, usually used in ordinary non-alcoholic beverages, in forms, which are necessary for this. Nonexclusive examples of

non-alcoholic beverage of the present invention comprising food components include milk non-alcoholic cocktail, milk-fruit cocktail, etc.

Nonexclusive examples of food component, which can be used in the beverages of the present invention, include milk, concentrated low-fat milk, dried milk, cream, chocolate, egg, cocoa, juice, etc. or mixture thereof.

Nonexclusive examples of food component, which can be used in the beverages of the present invention, include milk, concentrated milk, concentrated low-fat milk, dried milk, cream, chocolate, egg, cocoa, natural juice, etc. or mixture thereof.

Nonexclusive examples of inorganic salts, which can be used in the beverages of the present invention as a physiologically acceptable component, include sodium chloride, sodium bicarbonate, calcium chloride, magnesium sulfate, etc. or mixture thereof.

Nonexclusive examples of minerals, which can be used in the beverages of the present invention as a physiologically acceptable component, include calcium, magnesium, boron, chromium, cobalt, copper, fluoride, germanium, iodine, iron, lithium, magnesium, manganese, molybdenum, phosphorus, potassium, selenium, silicon, sodium, sulfur, vanadium, zinc, etc. or mixture thereof.

Nonexclusive examples of nutrients, which can be used in the beverages of the present invention as a physiologically acceptable component, include carbohydrates, protein, lipid, essential fatty acid, amino acid and its derivation, etc. or mixture thereof.

Nonexclusive examples of amino acid and its derivation include phenylalanine, isoleucine, zinc amino acid chelate, etc. or mixture thereof.

Nonexclusive examples of vitamins, which can be used in the beverages of the present invention as a physiologically acceptable component, include retinol and retinoid, ascorbic acid, tocopherol, calciferol, thiamin, riboflavin, niacin, pantothenates, pyridoxine, folic acid, cobalamin, biotin, choline, inositol,
5 lipoic acid, carnitine and their derivatives, etc. or mixture thereof.

Nonexclusive examples of synthetic or natural flavanol, which can be used in the beverages of the present invention as a physiologically acceptable component, include catechin, epicatechin, gallocatechin, epigallocatechin, epicatechin gallate, and epigallocatechin gallate and their derivatives, etc. or
10 mixture thereof. The amount of flavanols in the compositions of the present invention can vary. However, preferably from about 0.001% to about 5%, of one or more flavanols is utilized, by weight of the composition.

Nonexclusive examples of antioxidant, which can be used in the beverages of the present invention as a physiologically acceptable component,
15 include ascorbic acid, alpha-tocopherol, selenium.

The compositions of the present invention can contain an effective amount of one or more sweeteners as a physiologically acceptable component, including carbohydrate sweeteners and natural and/or artificial no/low calorie sweeteners.

20 Nonexclusive examples of sweetener include natural sweeteners, such as sucrose, fructose-glucose liquid sugar, purified honey, glycyrrhizin, stevioside, the protein sweetener thaumatin, the juice of Luo Han Guo; or artificial non-caloric sweeteners, such as aspartame, saccharin, cyclamates, acesulfame K, etc. or mixture thereof. Sweetened beverages will typically comprise from about
25 0.1% to about 20% natural sweetener. The total non-caloric sweetener is

preferably utilized at levels from about 0.0001% to about 5% by weight of composition.

One or more flavoring agents as a physiologically acceptable component are recommended for the embodiments of the present invention in order to enhance their palatability. Any natural or synthetic flavor agent can be used in the present invention. For example, one or more botanical and/or fruit flavors may be utilized herein. As used herein, such flavors may be synthetic or natural flavors.

Nonexclusive examples of fruit flavourings include apple flavor, citrus flavor, grape flavor, raspberry flavor, cranberry flavor, cherry flavor, grapefruit flavor; and also exotic flavors such as, for example, passion fruit flavors, mango flavors, pineapple flavors, cupuacu flavors, guava flavors, cocoa flavors, papaya flavors, peach flavors, and apricot flavors, etc. or mixture thereof. Nonexclusive examples of botanical flavors include tea, aloe vera, guarana, ginseng, ginkgo, hawthorn, hibiscus, rose hips, chamomile, peppermint, fennel, ginger, licorice, lotus seed, schizandra, saw palmetto, sarsaparilla, safflower, St. John's Wort, curcuma, cardimom, nutmeg, cassia bark, buchu, cinnamon, jasmine, haw, chrysanthemum, water chestnut, sugar cane, lychee, bamboo shoots, vanilla, coffee, etc. or mixture thereof. Typically the flavoring agents are conventionally available as concentrates or extracts or in the form of synthetically produced flavoring esters, alcohols, aldehydes, terpenes, sesquiterpenes, and the like.

Nonexclusive examples of herbal extracts, which can be used in the beverages of the present invention as a physiologically acceptable component, include guarana extract, aloe vera extract, ginkgo extract, korean ginseng extract, etc. or mixture thereof.

Nonexclusive examples of essence, which can be used in the beverages of the present invention as a physiologically acceptable component, include orange essence, blackcurrant essence, lemon essence, lime essence, cranberry essence, etc. or mixture thereof.

5 Nonexclusive examples of synthetic or natural coloring agent, which can be used in the beverages of the present invention as a physiologically acceptable component, include artificial food dyes and conventional food or food colorants, such as riboflavin and b-carotene, caramel colorant, and also fruit, vegetable, and/or plant extracts such as grape, black currant, aronia, carrot, beetroot, red
10 cabbage, and hibiscus, etc. or mixture thereof. The amount of coloring agent used will vary, depending on the agents used and the intensity desired in the finished product, preferably, from about 0.0001% to about 0.5%, by weight of the composition.

Nonexclusive examples of aromatizers, which can be used in the
15 beverages of the present invention as a physiologically acceptable component, include natural cola-aromatizator, tea- aromatizator, etc. or mixture thereof.

Nonexclusive examples of food acid, which can be used in the beverages of the present invention as a physiologically acceptable component, include siccine acid, malic acid, tartaric acid, gluconic acid, citric acid, lactic acid,
20 maleic acid, fumaric acid, ascorbic acid, phosphoric acid, etc. or mixture thereof.

Nonexclusive example of bracer, which can be used in the beverages of the present invention as a physiologically acceptable component, include natural bracers, such as coffee, tea, kola nut, cacao pod, mate, royal jelly, yaupon,
25 guarana paste, and yoco or synthetically produced caffeine, theobromine, and theophylline, etc. or mixture thereof. The amount of bracers in the compositions

of the present invention can vary. Compositions of the present invention can comprise from about 0.0005% to about 1% of a bracer.

Nonexclusive examples of technological additives, which can be used in the beverages of the present invention, include preservative, emulsifier, acidulant, gelling agent, thickener, stabilizer, carbonate component, etc. or mixture thereof.

Nonexclusive examples of preservatives include polyphosphate preservatives (for example, sodium hexametaphosphate), sorbic acid, benzoic acid, and salts thereof, including (but not limited to) calcium sorbate, sodium sorbate, potassium sorbate, calcium benzoate, sodium benzoate, potassium benzoate, EDTA (ethylenediaminetetraacetic acid), etc. or mixture thereof. The preservative is preferably included at levels from about 0.0005% to about 0.5%, by weight of the beverage composition. Wherein the beverage comprises a mixture of one or more preservatives, the total concentration of such preservatives is preferably maintained within these ranges.

Nonexclusive examples of emulsifier include gum acacia, modified food starches (e.g., alkenylsuccinate modified food starches), anionic polymers derived from cellulose (e.g., carboxymethylcellulose), gum ghatti, modified gum ghatti, xanthan gum, tragacanth gum, guar gum, locust bean gum, pectin, etc. and mixtures thereof.

Nonexclusive examples of acidulant include organic or inorganic edible acids. Organic acids which include citric acid, malic acid, fumaric acid, adipic acid, phosphoric acid, gluconic acid, tartaric acid, ascorbic acid, acetic acid, phosphoric acid or mixtures thereof. The acids can be present in their undissociated form or, alternatively, as their respective salts, for example, potassium or sodium hydrogen phosphate, potassium or sodium dihydrogen

phosphate salts. Beverage acidity can be adjusted to and maintained within the requisite range by known and conventional methods, e.g., the use of one or more of the aforementioned acidulants. Typically, acidity within the above recited ranges is a balance between maximum acidity for microbial inhibition and optimum acidity for the desired beverage flavor. The acidulant can also
5 serve as an antioxidant to stabilize beverage components. Examples of commonly used antioxidant include but are not limited to ascorbic acid, EDTA (ethylenediaminetetraacetic acid), and salts thereof.

Nonexclusive examples of thickener include suspending bodying agent, setting agent, gel builder, bulking agent, etc. or mixture thereof.
10

Nonexclusive examples of gelling agent include algenic acid, sodium alginate, potassium alginate, calcium alginate, agar etc. and mixtures thereof.

The same agents may also be used as gelling agent, food stabilizer, thickener. So, algenic acid and sodium alginate may be used not only as gelling agent but as stabilizer, thickener, emulsifier. Agar, which is gelling agent, may
15 be used as thickener and emulsifier.

All physiologically acceptable components are used in forms, which are necessary for production one or another non- alcoholic beverage. Such components may be dispersed, solubilized, or otherwise mixed into the present compositions
20

For practicing the invention we offer the method of increasing $^1\text{H}_2^{16}\text{O}$ content in non-alcoholic beverage in comparison with typical $^1\text{H}_2^{16}\text{O}$ content in ordinary non- alcoholic beverages by addition highly pure water with content from about 99.76 % to about 99.99% of $^1\text{H}_2^{16}\text{O}$ in necessary quantity to any
25 non-alcoholic beverage composition.

Highly pure light water can be mixed with typical water with typical content of $^1\text{H}_2^{16}\text{O}$ from about 99.731% to about 99.757 % by weight of water, for example typical drinking water. Obtained drinking water is enriched with $^1\text{H}_2^{16}\text{O}$, or in other words, light drinking water. Light drinking water of the invention can be table drinking water, mineralized water, mineral water, mineral table water, treatment-prophylactic mineral water, mineral-medicinal water, baby drinking water.

Herein and after, drinking water, mineralized water, mineral water, etc. with increased content of $^1\text{H}_2^{16}\text{O}$, in comparison with typical drinking, mineralized or mineral water can be named «light drinking water», «light mineralized water», «light mineral water», etc.

Nonexclusive examples of drinking water with typical content of $^1\text{H}_2^{16}\text{O}$ from about 99.731% to about 99.757 % by weight of water, which can be used in the beverages of the present invention, include any bottled drinking water, artesian water and drinking water from other natural spring, etc.

Nonexclusive example of typical mineralized water which can be used in the beverages of the present invention, include artificial mineralized water, which is mixture of reverse osmosis water and necessary mineral components, etc.

Nonexclusive example of typical mineral water which can be used in the beverages of the present invention, include any water with ascertained mineral composition from natural mineral spring, etc.

In the present invention, the light drinking or mineral water enriched with $^1\text{H}_2^{16}\text{O}$ can comprise inorganic salts and minerals in an amount up to necessary levels observed in typical drinking or mineral water. It can be prepared by mixing in certain ratios highly pure light water with typical drinking or mineral

natural water with ascertained mineral composition. For example, the total mineralization of typical drinking water can be within the limits of 200-1000 mg/l, in mineral water the total mineralization can amount more than 10 g/l. Typically, in bottled drinking water the level of Ca amounts up to 130 mg/l, the
5 level of Mg in bottled drinking water amounts up to 65 mg/l.

The example of non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, which is drinking water, more specifically, table drinking water of the present invention, include, but are not limited to, table light drinking water enriched with $^1\text{H}_2^{16}\text{O}$ in an amount up to 99.80% by weight with total mineralization 300 mg/l, with
10 concentration of Ca 35 mg/l, Mg 10 mg/l.

Also, in the present invention, the light drinking or mineral water enriched with $^1\text{H}_2^{16}\text{O}$ can be prepared by addition to highly pure light water of essential mineral components, such as inorganic salts and minerals, up to necessary level.

15 The examples of inorganic salt include, but are not limited to, sodium chloride, sodium bicarbonate, calcium chloride, magnesium sulfate, etc. or mixture thereof. The examples of mineral include, but are not limited to, Ca, Mg, Na, B, F, etc. or mixture thereof.

The light drinking water of the invention can be used for cooking and
20 baby's formulae. Preferably, the light drinking water of the invention is bottled drinking water, and may be carbonated or still.

In case when highly pure light water is mixed with physiologically acceptable components (including typical water or without it), one can get any light non alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, comprising blended
25 beverage, such as table beverage, beverage for special purpose, refreshing

beverage, cool beverage, tonic, lemonade, non-alcoholic cocktail, and also juice, nectar, kissel, mors, tea, kvass, non-alcoholic beer.

Choice of acceptable component and final content of any physiologically acceptable component depends on the subsequent usage of any non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$ as table beverage, beverage for special purposes, refreshing beverage, cool beverage, tonic, lemonade, nonalcoholic cocktail, etc.

The examples of a non-alcoholic beverage for special purposes include, but are not limited to, beverage for fitness, sports drink, nutritive drink, etc.

In the present invention some of non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$ can be prepared by ordinary mixing the ingredients, i.e. by addition of necessary physiologically acceptable components to highly pure light water according to conventional methods. Obtained beverages enriched with $^1\text{H}_2^{16}\text{O}$ are light beverages, for example blended beverage, such as lemonade, comprising highly pure light water can be name light lemonade. Light juice or nectar of the invention, can also be prepared by mixing highly pure light water with other necessary components. Nonexclusive examples in this case include, but are not limited to, mixing of the highly pure light water with natural juice or nectar, or with concentrated juice.

The other beverages comprising kissel, mors, tea, kvass, non-alcoholic beer can be prepared by usage of highly pure light water directly at any stage of non-alcoholic beverage production. Nonexclusive example in this case is non-alcoholic beer, when highly pure light water can be added at the stage of wort production.

Moreover, typical water may be substituted for highly pure light water enriched with $^1\text{H}_2^{16}\text{O}$ in any non-alcoholic beverage. Blended beverage, kissel, mors, tea, kvass enriched with $^1\text{H}_2^{16}\text{O}$, etc. may be produced by this manner.

Except water, other components of any non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$ remain the same according to the typical composition for conventional production methods of any blended beverage, kissel, mors, tea, kvass, non-alcoholic, etc. The solid ingredients may be dissolved in light water or in hot
5 light water if required prior to addition to the other components.

Preferably, the non-alcoholic beverage is bottled, packaged or canned and saturated with carbon dioxide or still. Any conventional carbonation methodology may be utilized to make carbonated beverage compositions of this invention. The amount of carbon dioxide introduced into the beverage will
10 depend upon the particular flavor system utilized and the amount of carbonation desired. The carbonated beverage can be placed into a container, such as a bottle or can, and then sealed.

Preservatives may or may not be needed for use in the present compositions. Techniques such as aseptic and/or clean-fill processing may be
15 utilized to avoid preservatives. Typically drinks are pasteurized prior to filling in bottles, cans or other packs or are "in-pack pasteurized" after filling.

Water is an essential component of all biological systems. The functions of water are not limited to the role of the medium where the biochemical processes and diffusion of the metabolites take place. Water takes direct part in
20 chemical reactions, in the osmoregulation and the transport of nutrients, structurization and stabilization of biopolymer molecules and permolecular systems providing their conformational mobility.

As mentioned above, light and heavy water isotopologues have distinct properties in biological system. For example, heavy water isotopologues
25 decrease the rate of biochemical reactions, disturb conformational mobility of the molecules of biopolymers (Chervenak et al. JACS, 1994, 116 (23): 10533-

10539. Malchatadze et al., Nature Struct. Biol., 1995, 2 (10): 852-855. Connelly et al., PNAS, 1994, 91: 1964-1968. Cupane et al., Nucleic Acids Res. 1980, 8 (18): 4283-4303). Thus, heavy isotopes-comprising molecules in mammal organism decrease of functional resources of the organism.

5 As mention above, the content of isotope varieties of water molecule such as: $^1\text{H}_2^{16}\text{O}$, $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ in human organism directly depends on the content of said isotope varieties of water molecule in a non-alcoholic beverage used by human.

Usage of non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$ in an amount no
10 less than 99.76 % by weight of water, prepared in accordance with present invention, is able to increase the content of light water molecules of $^1\text{H}_2^{16}\text{O}$ and to decrease the content of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ in human organism, and leads to improving of human wellness and life quality.

15 Non-alcoholic beverages enriched with $^1\text{H}_2^{16}\text{O}$ in an amount no less than 99.76 % by weight of water of non-alcoholic beverage, which are obtained by the present invention, are a new product which has not been produced up to this time.

Non-alcoholic beverages enriched with $^1\text{H}_2^{16}\text{O}$ in an amount no less than
20 99.76 % by weight of water of non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$ in an amount no less than 99.76 % by weight of water, are beverages with best quality, because they offer all advantages of light water.

The following examples are presented to demonstrate the invention. The examples are illustrative only and are not intended to limit the scope of the
25 invention in any way.

Example 1

This example demonstrates the method for producing highly pure light water of the invention.

Highly pure light water comprising 99.99% of light isotopologue $^1\text{H}_2^{16}\text{O}$ is prepared by distillation of typical natural water comprising 99.70% of light isotopologue $^1\text{H}_2^{16}\text{O}$ with using the apparatus in FIG.1 under temperature 60°C and pressure 0.2 bars. The process of the distillation includes:

- evaporating typical natural water comprising 99.70% [C_1] of light isotopologue $^1\text{H}_2^{16}\text{O}$ in boiling (see Fig 1,1) to produce water vapor;
- 10 - supplying the water vapor to the bottom (2) of distillation column (3);
- carrying out vapor-liquid contact between a descending liquid and an ascending vapor mainly on the surface of the contact device (4) (e.g. structured or random packing) within the distillation column, simultaneously the liquid and the vapor flow in mutually opposite directions over the surface of the contact device along a main flow direction which is a direction of the column axis;
- 15 - condensing water vapor with concentration of light isotopologue $^1\text{H}_2^{16}\text{O}$ 99.99% [C_2] on condenser (5) installed on upper bound of the distillation column;
- 20 - and collecting a part of condensate as condensed highly pure light water comprising 99.99% of light isotopologue $^1\text{H}_2^{16}\text{O}$ [$C_2 > C_1$] appropriate for producing light non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$.

Then, the highly pure light water comprising 99.99% of light isotopologue $^1\text{H}_2^{16}\text{O}$ is used for manufacturing of light non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$ no less than 99.76% by weight of water of said non-alcoholic beverages.

Example 2

This example demonstrates non-alcoholic beverage, which is light mineralized drinking water enriched with $^1\text{H}_2^{16}\text{O}$.

Ingredients	Content, weight %
Highly pure light water enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is 99.80% by weight of water	99.953
Calcium chloride	0.015
Magnesium chloride	0.007
Sodium bicarbonate	0.025
Obtained light drinking water enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is 99.80% by weight of water of said non-alcoholic beverage, total mineralization 0.047% or 470 mg/dm ³	100

The method for preparing the light mineralized drinking water described in Example 2 was as follows: components such as bicarbonate and chloride salts of calcium, magnesium, and sodium were dissolved in light water at room temperature. Addition of certain inorganic salts to light water provides the necessary mineralization of light drinking water.

Example 3

This example demonstrates non-alcoholic beverage, which is light mineral drinking water enriched with $^1\text{H}_2^{16}\text{O}$, obtained by mixing light water and mineral natural water with ascertained mineral composition.

One of mineral compositions of natural mineral water:	mg/dm ³
Total mineralization	2800-5300
Cl (Chloride)	1400-2500
Na (Natrium)	750-1540
Ca (Calcium)	170-340
SO ₄ (Sulphate)	350-530
HCO ₃ (Hydrocarbonat)	190
H ₃ BO ₃ (Boric acid)	40-43

Light mineral drinking water enriched with $^1\text{H}_2^{16}\text{O}$

Ingredients	Content, weight %
Distilled highly pure light water enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is 99.90% by weight of water	20
Typical natural mineral water with typical content of $^1\text{H}_2^{16}\text{O}$ in an amount 99.731% by weight of water and total mineralization 5.0 g/dm ³	80
Obtained light mineral drinking water enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is 99.7648% by weight of water of said non-alcoholic beverage, total mineralization about 4 g/dm ³	100

Thus, the final content of $^1\text{H}_2^{16}\text{O}$ in the light mineral drinking water amounts 99.7648%, that is higher than typical values in typical natural mineral waters.

The light mineral drinking water enriched with $^1\text{H}_2^{16}\text{O}$ retains all natural inorganic ingredients of typical natural mineral water. As a result, it has sufficiently high biological effectiveness, savoury taste and all side benefits of light water.

5

Example 4

This example demonstrates the non-alcoholic beverage composition enriched with $^1\text{H}_2^{16}\text{O}$, which is light non-alcoholic beverage.

Ingredients	Content, weight percent
Glucose	4
Sucrose	5.86
Maltodextrin	2.0
Fruit Juice	10
Green Tea Extract	0.12
Guarana Extract	0.06
Ascorbic Acid	0.04
Arabinogalactan (CLEARTRAC, commercially available from Larex, Inc., St. Paul, MN)	1.1
Sodium Citrate	0.1
Citric Acid	0.2
Highly pure light water enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is 99.80% by weight of water	up to 100 %

The final content of $^1\text{H}_2^{16}\text{O}$ in the water of the light non-alcoholic
10 beverage amounts no less than 99.789 % under the most exacting requirement,

that the total quantity of water of said beverage comprises up to 15 % typical water with the least content of $^1\text{H}_2^{16}\text{O}$ 99.731%, which is in a part of solid and liquid ingredients, and suitable quantity (no less than 85 %) of light water with content of $^1\text{H}_2^{16}\text{O}$ 99.80%.

- 5 The beverage composition is prepared by blending the listed components in a conventional manner. The light beverage enriched with $^1\text{H}_2^{16}\text{O}$ has savoury taste, aroma and all additional benefits of the light water.

Example 5

- 10 This example demonstrates the non-alcoholic beverage composition enriched with $^1\text{H}_2^{16}\text{O}$, which is light non-alcoholic beverage.

Ingredients	Content, weight , g
Sugar	124
Food Grade Acids	8.1
Buffer Salts	3.2
Vitamins	0.7
Artificial Colors	0.04
Clouding Agent	3.1
Thickening Agent	1.4
Mandarin Flavor Emulsion	1.76
Highly pure light water enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is 99.80% by weight of water	910

The final content of $^1\text{H}_2^{16}\text{O}$ in the water of light non-alcoholic beverage amounts no less than 99.792 % under the most exacting requirement, that quantity of typical water with the least content of $^1\text{H}_2^{16}\text{O}$ 99.731 % amounts up to 12 % by weight of total beverage water.

Preparation: add ingredients to water with agitation. Stir till dissolved. Heat to 185.degree. F. 15 seconds. Pack aseptically.

The beverage enriched with $^1\text{H}_2^{16}\text{O}$, comprising light water, is better in sweet/sour blending, higher in aroma, and less bitter and sour in aftertaste, as compared with beverage, comprising typical water.

Example 6

This example demonstrates the non-alcoholic nutritive beverage enriched with $^1\text{H}_2^{16}\text{O}$, which is light nutritive beverage.

Ingredients	Content, Weight, g
Fructose-Glucose-Liquid Sugar	150
Purified honey	2.0
Guarana extract	1.0
Korean ginseng extract	0.1
Royal jelly	0.05
Vitamin C	0.5
Nicotinamide	0.1
Vitamin B.sub.1 hydrochloride	0.02
Vitamin B.sub.6 hydrochloride	0.02
L-Phenylalanine	0.04
L-Isoleucine	0.01
Citric acid	1.5
Perfume	2.0

Deionized highly pure light water enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is 99.80% by weight of water	balance
Total	1000

The final content of $^1\text{H}_2^{16}\text{O}$ in the water of light non-alcoholic beverage amounts no less than 99.79 % under the most exacting requirement, that quantity of typical water with the least content of $^1\text{H}_2^{16}\text{O}$ 99.731 % amounts up to 14 % by weight of total beverage water.

- 5 The beverage composition is prepared by blending the listed components in a conventional manner. The light nutritive beverage enriched with $^1\text{H}_2^{16}\text{O}$ has all additional benefits of light water.

Example 7

- 10 This example demonstrates the non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, which is light lemonade.

Ingredients	Content, weight percent
Highly pure light water enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is 99.79 % by weight of water	86.97
Sugar	12
Citric acid	0.1
Carbon dioxide	0.6
Natural aromatizator composition	0.18
Caramel colorant	0.1
Sodium benzoate	0.05

The final content of $^1\text{H}_2^{16}\text{O}$ in the water of light non-alcoholic beverage amounts no less than 99.78 % under the most exacting requirement, that

quantity of typical water with the least content of $^1\text{H}_2^{16}\text{O}$ 99.731 % amounts up to 12 % by weight of total beverage water.

The light lemonade enriched with $^1\text{H}_2^{16}\text{O}$ has savoury taste, aroma and all additional benefits of light water.

5

Example 6

This example demonstrates the light non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, which is light juice beverage.

Ingredients	Content, weight %
Highly pure light water enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is 99.85 % by weight of water	60
Sugar (the content of typical water is 0.2 %)	20
Concentrated orange (the content of typical water is 5 %)	20
	100

The final content of $^1\text{H}_2^{16}\text{O}$ in the water of light juice beverage amounts about 99.84 % by weight of water of non- alcoholic beverage.

10

The light juice beverage enriched with $^1\text{H}_2^{16}\text{O}$ prepared by mixing light water with concentrated orange juice. The beverage has sufficiently high restorative properties.

Example 7

15

This example demonstrates the method for producing non-alcoholic beer enriched with $^1\text{H}_2^{16}\text{O}$.

The non-alcoholic beer enriched with $^1\text{H}_2^{16}\text{O}$ is prepared by conventional manner including the steps of:

(1) preparing a composition including a malt, molasses and highly pure light water with content $^1\text{H}_2^{16}\text{O} = 99.88\%$ in an amount not less than 90 % by weight

of the composition

- (2) boiling said composition to make a wort;
- (3) adding a predetermined quantity of hops to said wort;
- (4) adding a predetermined quantity of brewers' yeast to said wort;
- 5 (5) aerating said wort to secure yeast growth;
- (6) pitching said wort with a yeast slurry to provide a cell count of about 80 to about 180 million yeast cells per ml;
- (7) fermenting the pitched wort at a temperature of 3 to 10.degree. C. for 1 to 40 hours;
- 10 (8) removing the yeast from the fermented wort;
- (9) filtering the resulting brew
- (10) electrolyzing the resultant brew by passing said resultant brew past a pair of two copper electrodes
- (11) adjusting the alcohol concentration of the brew with carbonated highly
- 15 pure light water with content $^1\text{H}_2^{16}\text{O} = 99.88\%$ to a preselected level, and then aging the resultant brew for at least 24 hours.

The final content of $^1\text{H}_2^{16}\text{O}$ in the total quantity of water into light non-alcoholic beer composition amounts no less than 99.82 % under the most exacting requirement, that the total quantity of water of said beverage comprises

20 up to 40 % typical water with the least content of $^1\text{H}_2^{16}\text{O}$ 99.731 %, which is received from solid and liquid beer ingredients, and suitable quantity (no less than 60 %) of light water with content of $^1\text{H}_2^{16}\text{O}$ 99.88%.

Obtained non-alcoholic beer enriched with $^1\text{H}_2^{16}\text{O}$ comprising the highly pure light water and not more than 3 % of alcohol in the aqueous-alcoholic

25 composition has better consumer properties as stores all additional benefits of light water, has savoury taste and aroma.

Example 8

30 adults consisting of men and women sampled light drinking water enriched with $^1\text{H}_2^{16}\text{O}$ prepared in accordance with example 2, wherein the content of $^1\text{H}_2^{16}\text{O}$ amounts 99.82 % by weight of water and total mineralization is 470 mg/dm³, in an amount from three to five glasses per day during one week.

Taste:

Tasted nice - 27 persons,

No taste - 3 persons.

Smell:

Do not mind - 30 persons,

Do mind - 0 person.

From these results, it can be seen that the light drinking water enriched with $^1\text{H}_2^{16}\text{O}$ obtained according to the present invention is the beverage which is easy to drink for many people.

Moreover, during this week all volunteers who sampled the light drinking water registered a moderate diuretic effect and better digestive functions.

Furthermore, during the following month after weekly taking of light drinking water all volunteers registered at least one effect on health-related improvements such as recovering from fatigue, physical conditions and physical activity improved, endurance and stamina improved.

This is evidence taking light drinking water enriched with $^1\text{H}_2^{16}\text{O}$ prepared in accordance with present invention improves human wellness and life quality.

WE CLAIM:

1. A non-alcoholic beverage enriched with $^1\text{H}_2^{16}\text{O}$, wherein the content of $^1\text{H}_2^{16}\text{O}$ is more than 99.76% to 99.9% by weight of water of said non-alcoholic beverage, comprising:

A) a highly pure light water in an amount from 20% to 99.9% by weight of said non-alcoholic beverage, wherein the highly pure light water is a composition comprising from more than 99.76 % to 99.99% of $^1\text{H}_2^{16}\text{O}$ by weight of highly pure light water and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly;

B) a typical water with typical content of $^1\text{H}_2^{16}\text{O}$ in an amount from 0 % to 80% by weight of said non-alcoholic beverage, wherein said water is a composition comprising from 99.731 molecular % to 99.757 molecular % of $^1\text{H}_2^{16}\text{O}$ and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly; and

C) a physiologically acceptable component in an amount up to 100% by weight of said non-alcoholic beverage.

2. The non-alcoholic beverage of claim 1, wherein the content of $^1\text{H}_2^{16}\text{O}$ is no less than 99.80 % by weight of water of said non-alcoholic beverage, comprising:

A) a highly pure light water in an amount from 20% to 99.9% by weight of said non-alcoholic beverage, wherein the highly pure light water is a composition comprising more than 99.80 % to 99.99% of $^1\text{H}_2^{16}\text{O}$ by weight of highly pure light water and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly;

B) a typical water with typical content of $^1\text{H}_2^{16}\text{O}$ in an amount from 0 % to 80% by weight of said non-alcoholic beverage, wherein said water is a composition comprising from 99.731 molecular % to 99.757 molecular % of $^1\text{H}_2^{16}\text{O}$ and residual amounts of $^1\text{H}_2^{17}\text{O}$, $^1\text{H}_2^{18}\text{O}$, $^1\text{H}^2\text{H}^{16}\text{O}$, $^1\text{H}^2\text{H}^{17}\text{O}$, $^1\text{H}^2\text{H}^{18}\text{O}$, $^2\text{H}_2^{16}\text{O}$, $^2\text{H}_2^{17}\text{O}$, $^2\text{H}_2^{18}\text{O}$ up to 100% correspondingly; and

C) a physiologically acceptable component in an amount up to 100% by weight of said non-alcoholic beverage.

3. The non-alcoholic beverage of claims 1-2, wherein the highly pure light water is selected from the group comprising distilled water, deionized water, reverse osmosis water.

4. The non-alcoholic beverage of claims 1-2, wherein the typical water with typical content of $^1\text{H}_2^{16}\text{O}$ is selected from the group comprising drinking water, mineralized water, mineral water, distilled water, deionized water, reverse osmosis water.

5. The non-alcoholic beverage of claims 1-2, wherein the physiologically acceptable component is at least one selected from the group comprising natural fruit juice, vegetable juice, berry juice, nectar, dry beverage composition, dietary fiber, food component.

6. The non-alcoholic beverage of claims 1-2, wherein the physiologically acceptable component is at least one selected from the group comprising inorganic salt, mineral, nutrient, vitamin, flavanol, anti-oxidant, flavouring, extract, essence, colorant, aromatizator, food acid, bracer, technological additive.

7. The non-alcoholic beverage of claims 1-2, wherein said non-alcoholic beverage is a drinking water.

8. The non-alcoholic beverage of claim 1-2, wherein said non-alcoholic beverage is selected from the group comprising table drinking water, mineralized water, mineral water, mineral table water, treatment-prophylactic mineral water, mineral-medicinal water, baby drinking water.

5 9. The non-alcoholic beverage of claims 7-8, wherein it is saturated with carbon dioxide.

10. The non-alcoholic beverage of claims 1-2, wherein said non-alcoholic beverage is a blended beverage.

10 11. The non-alcoholic beverage of claim 10, wherein said non-alcoholic beverage is selected from the group comprising table beverage, beverage for special purpose, refreshing beverage, cool beverage, tonic, lemonade, non-alcoholic cocktail.

12. The non-alcoholic beverage of claims 10-11, wherein it is saturated with carbon dioxide.

15 13. The non-alcoholic beverage of claims 1-2, wherein said non-alcoholic beverage is selected from the group comprising juice, nectar, kissel, mors, tea, kvass, non-alcoholic beer.

14. The non-alcoholic beverage of claim 13, wherein it is saturated with carbon dioxide.