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NEW METHODS, RATIONALIZATION AND INVENTION

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Molecular hydrogen generator GVCh Life

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Molecular hydrogen is one of the effective antioxidants, which not only does not disrupt normal metabolism in the body, but also activates its antioxidant systems. Hydrogen-saturated water has antioxidant, anti-inflammatory, anti-allergic, anti-apoptotic properties, stimulates energy metabolism and contributes to the systemic recovery of the body. It is used as a therapeutic factor for the treatment of patients with various pathologies: arterial hypertension, coronary heart disease, diabetes, obesity, metabolic disorders, disorders of the musculoskeletal system. The article discusses the various methods of obtaining molecular hydrogen and hydrogen water (direct and indirect saturation). Technical characteristics are described and features of the hydrogen generator GVCh Life (manufacturer LTD «Chemtest Ukraine+», Kharkiv, Ukraine), which produces molecular hydrogen (purity of which is 99.99 %, productivity — 100 ml/min) and saturates water with it (https://chemtest.com.ua/generator_vodorodnoy_vodi_i_dihanie_gvch_life). In contrast to the problems of most known generators in the device GVChLife is completely no contact of the electrodes with water, so it is not subject to electrolysis and is not saturated with metal ions. Water saturated in this way has the following characteristics: redox potential 560 mV, hydrogen concentration 1.0–1.15 ppm (water volume 1 l, saturation duration 10 min). The generator can be used for both hydrogen saturation and hydrogen inhalation. In the case of therapeutic use of hydrogen water to obtain it, you can use any drinking water (spring, prepared or non-carbonated bottled), hydrogen inhalation using nasal cannulas. Inhalation of pure hydrogen gas (99.99 %) for 30 minutes is equal to the use of 15 liters of hydrogen water (concentration 1.1–1.2 ppm). Conclusions. The developed MoHC Life molecular hydrogen generator is safe to use, without special requirements during operation. It can be successfully used in the complex therapy of patients with various diseases, including musculoskeletal system. Key words. Hydrogen generatoR GVCh Life, molecular hydrogen, hydrogen water, therapy of various diseases.

Молекулярний водень є одним з ефективних антиоксидантів, який не лише не порушує нормальний метаболізм в організмі, а ще й активізує його антиоксидантні системи. Вода, насичена воднем, має антиоксидантні, протизапальні, протиалергічні, антиапоптозні властивості, стимулює енергетичний метаболізм та сприяє системному оздоровленню людини. Її використовують як лікувальний чинник для терапії пацієнтів із різною патологією: артеріальною гіпертонією, ішемічною хворобою серця, цукровим діабетом, ожирінням, порушенням обміну речовин, порушеннями опорно-рухової системи. У статті обговорено різні способи одержання молекулярного водню та водневої води (пряма та непряма сатурація). Описано технічні характеристики та особливості генератора водню ГВЧ Life (виробник ТОВ «Хімтест Україна+», м. Харків, Україна), який виробляє молекулярний водень (чистота якого дорівнює 99,99 %, продуктивність — 100 мл/хв) і насичує ним воду (https://chemtest.com.ua/generator_vodorodnoy_vodi_i_dihanie_gvch_life). На відміну від більшості відомих генераторів у приладі ГВЧ Life повністю відсутній контакт електродів із водою, завдяки чому вона не піддається електролізу та не насичується іонами металів. Водень потрапляє до води через розпилювач. Насичена в такий спосіб вода має такі характеристики: окислювально-відновний потенціал 560 mV, концентрація водню 1,0–1,15 ppm (об'єм води 1 л, тривалість насичення 10 хв). Генератор можна використовувати і для насичення воднем води, і для інгаляцій воднем. У разі терапевтичного вживання водневої води для її отримання можна застосовувати будь-яку питну воду (джерельну, підготовлену або негазовану бутильовану), інгаляції воднем. Вдихання чистого газоподібного водню (99,99 %) протягом 30 хв дорівнює вживанню 15 л водневої води (концентрацією 1,1–1,2 ppm) Висновки. Розроблений генератор молекулярного водню ГВЧ Life є безпечним у користуванні, без особливих вимог під час експлуатації. Він може з успіхом бути застосованим у комплексній терапії пацієнтів із різними захворюваннями, у тому числі опорно-рухової системи.

Key words. Hydrogen generatoR GVCh Life, molecular hydrogen, hydrogen water, therapy of various diseases

In 2007, Japanese scientists proved the significant antioxidant role of hydrogen in the human body under conditions of systemic use. Currently, more than 30 % of Japanese and more than 20 % of the population of the Republic of Korea use only water saturated with hydrogen. It is known that the average life expectancy in Japan is 87 years.

Molecular hydrogen «H_2» is a small and safe molecule for the human body, which has unique properties that make it invaluable to our health [1].

Hydrogen-rich water has antioxidant, anti-inflammatory, anti-allergic, anti-apoptotic properties, stimulates energy metabolism and promotes systemic recovery. According to many foreign publications, hydrogen water is an ideal therapeutic factor for the treatment of patients with various pathologies, namely: hypertension, coronary heart disease, diabetes, obesity, metabolic disorders, disorders of the musculoskeletal system. Today, molecular hydrogen is used in the treatment of Covid-19 [2–4]. In particular, the factor is included in the standards of treatment of this disease in China.

The amount of information on the use of molecular hydrogen for the prevention and treatment of various diseases has been increasing recently. To date, more than 2,000 scientific papers have been published and more than 1,600 studies have been performed on more than 176 models of human and animal diseases, which confirm that molecular hydrogen has great therapeutic potential. Over the years, the study of the effects of molecular hydrogen has not been observed any adverse side effects under conditions of its use in reasonable and approved therapeutic doses.

The most common ways to use hydrogen are hydrogen water and hydrogen inhalation. Hydrogen water is drinking water with a high concentration of hydrogen. It is prepared from ordinary drinking water by direct saturation of molecular hydrogen. Saturation is a method of saturating a liquid with any gaseous substance. The main characteristic of hydrogen water is a large negative redox potential (ROP) from 150 to 600 mV. It should be noted that the level of acid-base balance does not change during saturation and corresponds to the pH level of the source water, which was enriched with molecular hydrogen.

Main qualities and results of hydrogen consumption:

– easy penetration of hydrogen molecules into all cells, tissues, organs and easy assimilation by the body;

– prevention of oxidative stress (antioxidant functions) — hydrogen molecules neutralize free radicals in the body, which provoke acute and chronic diseases. Their elimination also helps to slow down the aging process;

– improving male fertility;

– neutralization of the negative effects of smoking;

– normalization of hydration compared to the use of ordinary water;

– external use of hydrogen water during cosmetic procedures enhances the prophylactic and therapeutic effects of the means and drugs used;

– internal use of such water improves the general condition of the skin, reduces inflammation, redness, rashes and reduces the number of wrinkles;

– relief of weather sensitivity;

– increase the positive effect of the use of dietary supplements and vitamins;

– normalization of metabolism, which leads to the gradual normalization of weight [5–7].

Regular consumption of hydrogen water helps to slow down the aging of the body, its overall strengthening and resistance to disease, improving protective functions (immune system), rapid recovery after exercise, increase endurance, strength, increase efficiency, sleep normalization.

Japanese, Chinese and other manufacturers offer a variety of generators to produce pure hydrogen or saturated water based on several basic technologies, namely: saturation of water with hydrogen gas (direct saturation), electrolysis of water (chemical reaction of water with metals or hydrides).

Realizing the importance of hydrogen in restoring human health and increasing interest in it in the world, the Ukrainian manufacturer LLC «Himtest Ukraine+» (Kharkiv, Ukraine) has developed and released a version of the hydrogen generator GVCh Life, which is a modification of the laboratory hydrogen generator GVH 6X for chromatography (https://chemtest.com.ua/generator_vodorodnoy_vodi_i_dihanie_gvch_life). The purity of the hydrogen produced by the generator is 99.99 % (pure hydrogen is selected, which saturates the water, the water itself does not participate in electrolysis), with a capacity of 100 ml/min. The main element of the device is an electrolytic module with electrodes made of porous titanium with platinum coating.

A feature of the device is the lack of heating. Therefore, it can work around the clock. In addition, the use of most hydrogen generators on the market involves contact of the electrodes with hydrogen-enriched water, as a result of which it is converted into electrolyte and saturated with metal ions (nickel, iron, manganese, depending on which alloys the electrodes are made of). Their content is small, but in the case of prolonged use of such water, they can accumulate

in the human body, which is not useful. In the hydrogen generator GVCh Life (Ukraine, Kharkiv, LLC «Himtest Ukraine+») there is no contact of electrodes with water, and saturated water is not subject to electrolysis. Hydrogen enters the water through a spray to enrich it. Saturated water in this way has the following characteristics: ROP — 560 mV, hydrogen concentration 1.0–1.15 ppm (water volume 1 l, saturation duration 10 min), according to the recommendations of the International Molecular Hydrogen Association (IMHA) in Guangzhou, China (Sept. 14, 2017) (International Hydrogen Molecular Association) [2].

Quality water should be used during operation of the hydrogen generator. Distilled or injectable water is allowed in the GVCh Life hydrogen generator, while most manufacturers require the use of double-distilled or deionized water. This is a guarantee of a long service life of the generator. Also an important feature of the hydrogen generator is the ability to control water quality in real time. If the value of water conductivity exceeds the permissible values of the norm, a message appears on the generator screen about the need to replace it. When the water level falls below normal, information is displayed on the screen and a beep sounds. Operation of a hydrogen generator without water leads to the destruction of the cell (the main part of the generator), so a water level control system was installed.

The developed hydrogen generator can be used both for hydrogen saturation of water, and for hydrogen inhalations. For therapeutic use of hydrogen water, it is possible to choose any drinking water for its production — spring, prepared or bottled (non-carbonated). Nasal cannulas are used for hydrogen inhalation.

During hydrogen inhalation, H_2 gas enters the human body only in pure form (99.99 %). During inhalation, it mixes with air and enters the body no more than 2–4 % of hydrogen. Thus, inhalation of pure hydrogen gas (99.99 %) for 30 min is equal to the use of 15 liters of hydrogen water (concentration 1.1–1.2 ppm) [4, 8].

Conclusions

The GVCh Life molecular hydrogen generator is safe to use, with no special operational requirements. It can be successfully used in the complex therapy of patients with various diseases, including disorders of the musculoskeletal system.

Conflict of interest. The authors are developers of the GVCh Life device.

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