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Generalized Method of Calculation of Modified Spectrum Water

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Abstract: ***The article is devoted to the development of a generalized methodology for calculating the joint characteristics of the effect of modified spectrum water. Water quality control is important to recognize because of water pollution and disease. A framework for a review of water quality should be defined to ensure that if water quality is measured as appropriate, it should be expected. Basically, water quality monitors to ensure water safety are both sleepy and standard waters nearby and global. Various water sampling methods and technology can be used to determine the level and quantity of a chemical in water as test water. The article describes how to prepare water used in hydrogen generators, to prepare solutions, chromatographic samples, capillary electrophoresis, high performance liquid chromatography (HPLC), and other analyzers that require the use of high purity water. The study showed that the use of spring water with a modified spectrum leads to positive statistically significant changes. The article presents results according to the absolute measurements of the luminosity of water. As a result of the calculations, graphical dependencies of the joint characteristics of the efficiency of using spectrograph. A CDS / (Pt-TiO2) pumice was created without creating a Titania composite in the pumice in accordance with the floating coating, so that photocatalysis did not cause problems in the separation of the titanium solution. European Microscopy Emission Range (FESEM), Microscope Transmission (TEM), Used UV Visible Diffusion Spectroscopy (UV-Vis DRS), such as Photocatalyst Characterization.***

Keywords: ***rate of spectrum processes, wireless Sensor Networks structurally modified water, GSM, spectrograph, real time monitoring.***

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I. INTRODUCTION

The water treatment system is used to prepare water used in hydrogen generators, to prepare solutions, chromatographic samples, capillary electrophoresis, high performance liquid chromatography (HPLC), and other analyzers that require the use of high purity water. The system is connected directly to the city water supply line and allows to obtain high-purity deionized water with a specific electrical conductivity of 0.06 - 0.1 μS / cm. The device uses multi-stage water treatment.

The mechanical filter provides water purification from dirt, suspended particles, insoluble impurities, silt, sand, colloidal compounds, rust, large (up to 10 microns in size) inclusions, foreign bodies insoluble in water. Resource of the mechanical filter - 6000 liters;

Carbon filters (two stages) provide the absorption of chlorine dissolved in water, other gases, organic compounds, salts of heavy metals. The resource of the coal filter - 6000 liters (each step);

The reverse osmosis membrane is a special membrane, the openings of which (10E-10 m) pass water molecules, oxygen, alcohols and methane derivatives, traces of organic matter, trapping the basic salts of light metals, bacteria, viruses, metabolic products of bacteria and viruses, mold spores - selectivity 96% Membrane resource - 3500 liters;

Block of ion-exchange filters - delays missed membrane salts of light metals, reduces the conductivity of water to 0.06 - 0.1 μS / cm. The cleaning efficiency of 99%.

All stages of the system are interchangeable and can easily be replaced by new ones. The electrical conductivity of the water at the system outlet is controlled by an integrated conductivity meter. Water sampling can be carried out without waiting for achievement of electric conductivity indices of 0.06 - 0.1 μS / cm, and it can be carried out ahead of schedule, provided that these water purity indices fully satisfy the Customer.

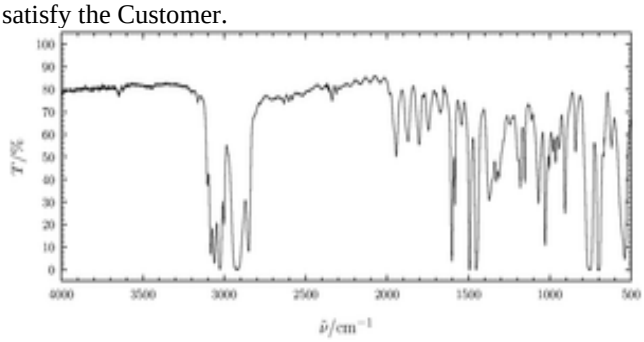

Fig. 1.IR spectrum recorded from a film of a substance in transmission mode (T).

The problem of searching for drug-free means to improve the recovery processes in the healthy human body and increasing physical activity has been a topic of many scientific papers [1, 3, 6, 8, 9, 11, etc.], which indicates its relevance. It has been shown that a positive effect is achieved as a result of the practical use of various drug-free agents: contrasting temperature effects and cryothermal exercises,

hyperbaric oxygenation, hypobaric and normobaric hypoxia, electrical tranquilization, transcranial electrical stimulation, electrical stimulation of the neuromuscular apparatus, effects on the biologically vital points of the skin and several others 1, 3, 6, 8, 9, 11, etc.]. It has been found [11, p. 197] that the integrated effect of pulsed electric current on the central nervous system and hyperbaric oxygenation, immediately before significant physical exercising increases athletes' performance.

The authors [6, p. 8] note the expressed and lasting positive impact of cyclic cryothermal effects on the physical performance of a person and consider it as a viable non-drug means of emergency and long-run extension level of the body capacity. It is noted [3, p. 14] that the combined use of cyclic common infrared and aerocryothermal effects improve physical endurance of the body.

Using the "gas discharge visualization technique" and "vedapulse technique", it has been established [10] that the pyramid stay has a positive effect on people's health. The authors acknowledge positive changes in the parameters of electron evaporation arising around fingers in a magnetic field, the voltage index of regulatory systems, the autonomic equilibrium index, and other indicators.

It has been found that modified spectrum water improves the ability to stimulate the oxidation processes and the formation of energy in mitochondria under normal and pathological conditions [5, 9]. Therefore, it is reasonable to assume that the intake of structurally modified water will increase the rate of recovery processes after a standard graduated exercise, as well as increase physical performance.

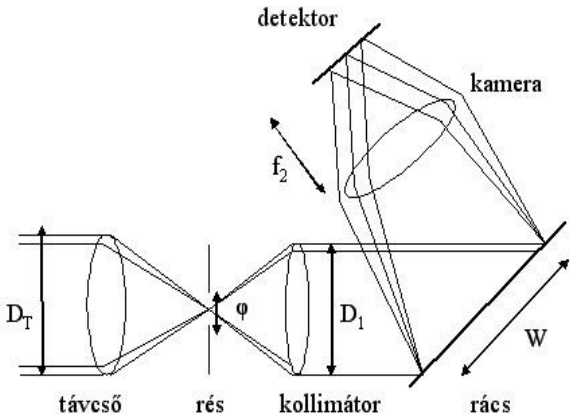

Fig. 2. Spectrograph scheme.

The purpose of this research is to study the effect of water intake with a modified spectrum on the speed of recovery processes after the standard graduated load and the level of physical performance of an average healthy person.

The carried out research is of laboratory type, in which a cross-comparison (case-crossover design) was involved. Cross-comparison was carried out in two stages. Participants of experimental studies were randomly divided into two groups.

During the first study, the participants performed a Harvard step test twice in order to measure the rate of recovery processes after the standard graduated exercises. The test procedure is described in detail in the literature [4]. The results of the Harvard step test describe the speed of recovery processes in the human body [4, p.108]. The participants performed standard muscular exercising of step load on a 0.30m high step, with a frequency rate of 120 steps per minute. The step time was 300s. Therefore, we received higher values of HST. It should be noted that the test conditions were slightly simplified due to the fact that the absolute HST indicators are not essential for achieving the set goal, but their dynamics are important under the influence of water intake. The low level of physical preparation of students also influenced the simplification of the Harvard step test.

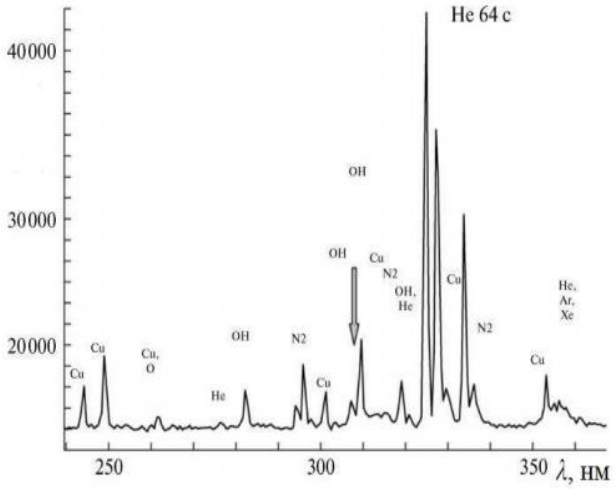

Fig. 3.Spectrum of plasma glow. The arrow indicates the (0,0) OH band.

The interferogram is the result of the operating cycle of the interferometer - scan ("scan") along the l axis from 0 to lm - one-sided scanning, or from -lm to + lm - two-sided scanning.[13] As the mirror moves, a light beam enters the receiver, the intensity of which in the case of a monochromatic source changes according to a cosine law. If - I(x) is the intensity of the light incident on the receiver, x is the displacement of the mirror 4 in centimeters, B (ν) is the source intensity as a function of the wave number ν in cm-1, then the signal intensity for the monochromatic source ν_1 changes according to the law:

$$I(x) = B(\nu 1)\cos(2\pi\nu 1x). \quad (1)$$

In the case of a "classical" scanning spectrometer, the spectrum will consist of a single band with a maximum ν_1

If we add the second frequency ν_2 to the radiation source, then the resulting dependence in the coordinates "mirror position - intensity" will be represented as the sum of two cosine waves:

$$I(x) = B(\nu 1)\cos(2\pi\nu 1x) + B(\nu 2)\cos(2\pi\nu 2x). \quad (2)$$

If we add a third, fourth, etc., to an infinite number of frequencies (i.e., consider polychromatic sources, such as an incandescent lamp or a heat source - a globar, then a signal from the sum of cosine waves - an interferogram - appears in the receiver.

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During the second study, the participants also performed the PWC170 test twice in order to analyze the dynamics of their physical performance. The test procedure is described in detail in the literature [4, p. 75-95].

Polar RS-400 sports testers were used to record the heart rate since they allowed us to accurately estimate the response of the pulse to the measured physical activity.

The first test was a background on, after which the participants drank 200ml of water and after taking 35 minutes passive rest, Then they took the Harvard step test for the second time, and during the second study, they performed the PWC170 test. During the first stage, one group drank 200ml of spring water, and the second one drank 200ml of modified spectrum water. During the second stage, they changed the water to the one that participants drank before taking this test. The second stage of the research was carried out a week later at the same time as the first phase. The experiment was brought to an end, that is, the participants did not know what kind of water they drank. Thus, all participants, one by one but in different order were exposed to the effect of the studied factor, which increases the reliability of the findings.

The first research involved 51 people, 24 women and 27 men aged 19 to 21 years old, students of Sochi State University. The second study involved 8 men regularly doing mountaineering, aged 34 to 61 years. Criterion to participate in the experiment was voluntary consent. The research procedure met the ethical committee standards.

The findings were processed through the Microsoft Excel 2010 and SPSS Statistics v22.0. To estimate the statistical significance of differences in results before and after taking water with a modified spectrum (linked samples) the Wilcoxon singed-rank test [2] was used. The testers calculated the arithmetic average (M) and standard deviation (SD), the standard error of the arithmetic average (m), the percentage change in the rate of recovery processes after the standard graduated exercise in an average healthy person during repeated testing and drinking modified spectrum water.

As a zero statistical hypothesis, it was assumed that the intake of structurally modified water does not have a statistically significant effect on the rate of recovery processes after the standard graduated exercise and physical performance in an average healthy person. The alternative hypothesis is based on the assumption that the intake of modified spectrum water has a statistically significant positive effect on the rate of recovery processes after the standard graduated exercise and physical performance in an average healthy person. The acceptance or rejection of the null hypothesis was carried out at a level of importance of p = 0.05 (95%). [14]

II. CONCLUSION

Analysis of the results points to the fact that water intake with a modified spectrum has an expressed effect on the rate of recovery processes after the standard graduated exercise. This is reflected in more expressed (statistically significant) frequency drops in heart rate during the first minute of recovery (see table) in the experiment participants, and after taking modified spectrum water compared to the rate of frequency drops in heart rate in participants taking spring water. The observed trend can be traced within five minutes of recovery, the period when they monitored the dynamics of the heart rate.

Absolute measurements of the luminosity of water showed:

1. Transitions directly in the emission spectrum of H_2O molecules (the strongest Kitagawa bands) were not detected and it is unlikely that these spectral bands can be used in a wide range of plasma conditions for given purposes.

2. Speaking about the spectra of products of water transformations that are stable under normal conditions, the weak intensity of the O_2 and H_2 bands should be noted. It is also difficult to relate them to the empirical level with H_2O concentrations even during calibrations.

3. Among the bands of molecular fragments of the decay of water, the OH system (306-320 nm) is the most intense. As previously noted, according to this glow, with a certain organization of calibrations, it is possible to measure the concentrations of water molecules in the plasma.

4. Fragments of the water molecule - H and O have quite intense lines that allow them to be used in diagnostics. However, direct correlations of these intensities with H2O concentrations in a nonequilibrium plasma are not visible and the possibilities of calibrations with their participation are not clear. Here, additional research and new experimental and model physical approaches are definitely needed.

Comparison of the HST indicators in experiment participants before and after taking spring water does not have a statistically significant difference, and they tend to a slight index decrease.

Table 1. The dynamics of the studied parameters under the influence of taking spring water and pyramidal water (M±SD)

Indicators	Stages of the survey			
	Springwater		«Pyramidal» water	
	Initial	After taking water	Initial	After taking water
HST, unit	98,5± 6,21	97,9± 7,30	95,2± 6,68	100,2± 4,78*
% decrease in heart rate in 1 min. of recovery%	23,4± 7,71	23,5± 7,25	25,9± 6,65	29,8± 7,84*
PWC_{170} , kgm/min/kg	19,2± 2,7	15,5± 2,9*	20,3± 2,6	22,1± 2,4

* - fluctuations are statistically significant at p = 0.05

In the course of the research, it was found that the water intake with a modified spectrum has a statistically significant improvement in the HST indicators in the experiment participants compared to the effect of drinking spring water.

The results of the re-test in the PWC170 after taking spring water have a statistically significant decrease than the initial ones. This is probably due to the fact that the experiment participants performed the test for the second time and did not have time to recover. Drinking water with a modified spectrum has an expressed effect on physical performance in an average healthy person (table). The results of the PWC170 test indicate a positive effect of water with a modified spectrum on the results of the PWC170 test. This shows up in the fact that the test results have not decreased, but rather tend to improve.

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