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Dynamic Nano Clusters of Water on EVODROP Water

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Authors' contributions

This work was carried out in collaboration among all authors. Author II designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors GG and FH managed the analyses of the study. Author II managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

A research for nano clusters of electrochemically waters catholyte and anolyte was recently performed [1]. The actual study is connected with EVODROP water. Methods NES (Non-equilibrium Energy Spectrum) and DNES (Differential Non-equilibrium Energy Spectrum) are used for the study [2,3]. They allow the evaluation of hydrogen bonds energy. It is expected that these spectral analyses and mathematical models could help explaining the different effects of EVODROP water. Influence of different types of waters on the nervous system and anti-inflammatory and antitumor effects have been reported [4].

The device for the production of EVODROP water is invented by Fabio Huether. It transforms the tap water into alkaline one with a negative oxidation reduction potential (ORP) measured in millivolts (mV).

The study was performed of alteration of hardness of EVODROP water according tap water as control sample.

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Keywords: EVODROP water; number of water molecules; energy of hydrogen bonds; NES; DNES.

1. INTRODUCTION

Hydroxyl groups (-OH) in H_2O molecule are polar. The electromagnetic hydrogen bonds (O–H…O) connect H_2O molecules. Hydrogen bonds are much weaker than covalent bonds. The spectral method NES and DNES allow for the measurement of the parameters of hydrogen bonds with estimation of the effects in EVODROP water compared with a tap water as a control sample.

The water molecules could be banded into complex intermolecular clusters described by a general formula $(H_2O)_n$. EVODROP water has higher energies of hydrogen bonds and increased local extremums in spectrum compared to the control sample. The expectations are for some effects on human health.

A research performed with Raman spectroscopy has shown that hydrogen bonds among water molecules are constantly tearing, changing and moving (Geissler, Saykally, Smith, 2005). According to the model of Keutsch, Saykally, Smith with from 3 to 50 water molecules are connected [5,6,7]. These results correlate with our quantum-mechanical analysis of water spectrum [4]. Fowler, Quinn, Redmond [8] and Ignatov, Mosin suggested models with 3 to 60 water molecules [4]. Different models of water clusters has been described in the research of Shu et al. [9], Chaplin [10], Sykes [11], Liu, Cruzan, Saykally [12], Choi, Jordan, [13], Loboda, Goncharuk [14], Timothy S., Zwier S. [15].
The research of water clusters $(H_2O)_n$ are with the following methods ^{1}H-NMR, neurons diffraction, X-Ray, EXAFS-spectroscopy, IR spectroscopy, NES and DNES spectral methods. There ionic clusters $[(H_2O)_n]^+$ and $[(H_2O)_n]^-$.

In this research two of the authors Ignatov and Gluhchev have performed mathematical models of water molecules of EVODROP water and tap water. It is accepted that the aqueous solutions may undergo autoprotolysis, i.e. the H^+ proton is released from H_2O molecule and then transferred and accepted by the neighboring H_2O molecule resulting in formation of hydronium ions as H_3O^+, $H_5O_2^+$, $H_7O_3^+$, $H_9O_4^+$, etc. Thus, water should be considered as an associated liquid composed from a set of individual H_2O molecules, linked together by hydrogen bonds and weak intermolecular van der Waals forces [11]. The simplest example of such associate can be a dimer of water.

The following parameters of EVODROP water – spectral parameters, hardness, oxidation reduction potential (ORP) and pH are studied.

There are proofs for the effects of different types of drinking wates on human longevity [16,17,18], antitumor effects [19,20], anti bacterial and anti viral effects [21,22].

2. MATERIALS AND METHODS

2.1 NES and DNES Spectral Analyses

The device invented by A. Antonov [2], based on an optical principle and methods NES and DNES for spectral analysis are used. The evaporation of water drops is in hermetic camera with a glass plate and water-proof transparent pad which consists of thin maylar folio.

The parameters are:

- monochromatic filter with wavelength λ = 580±7 nm (yellow color in visible spectrum);
- angle of evaporation of water drops from 72.3° to 0°;
- temperature (+22–24 °C);
- range of energy of hydrogen bonds among water molecules is λ = 8.9–13.8 μm or E=-0.08– -0.1387 eV. ;

The energy ($E_{H...O}$) of hydrogen O...H-bonds among H_2O molecules in water sample is measured in eV. The function f(E) is called a spectrum of energies distribution. The energy spectrum of water is characterized by a non-equilibrium process of water droplets evaporation and this is a non-equilibrium energy spectrum (NES), measured in eV^{-1}. DNES is defined as the difference

Δf(E) = f (samples of water) – f (control sample of water),

where *f(*)* denotes the evaluated energy.

DNES is measured in eV^{-1} as well.

2.2 Electrical Measurements

The device – HANNA Instruments HI221 meter equipped with Sensorex sensors was used for the measurement of Oxidation Reduction Potential (ORP) in mV, and pH.

The Range of HANNA Instruments HI221 meter is:

pH - (2.00-16.00 ±0.01)

ORP (±699.9±0.01 – ±2000±0.1) mV

3. RESULTS AND DISCUSSION

3.1 Mathematival Models of Nano Clusters of EVODROP Water

A mathematical model of the number of water molecules according to the energy of hydrogen bonds in EVODROP water has been developed (Ignatov, Gluhchev, 2020) (1) (Table 1, Fig. 1).

The definition of the author of Nano clusters of EVODROP Fabio Hüther is EVODROP® Water.

The evaluation of the possible number of hydrogen bonds as percent of H_2O molecules in EVODROP water with different values of distribution of energies are presented in Table 2 and Fig. 2. These distributions are basically connected with the restructuring of H_2O molecules with the same energies. This serves as a mathematical model explaining the behavior of EVODROP water regarding the distribution of H_2O molecules to the energies of hydrogen bonds (Ignatov, Mosin, 2013) (2). The new model shows the number of water molecules and their structuring in clusters.

Table 1. Distribution of the number of water (H_2O) molecules in EVODROP water according to the energy of hydrogen bonds

-E(eV) x-axis	EVODROP® water number of water molecules	Tap water (Control sample) number of water molecules	-E(eV) x-axis	EVODROP® water number of water molecules	Tap water (control sample) number of water molecules
0.0912	0	7	0.1162	0	0
0.0937	0	0	0.1187	3	8
0.0962	5	8	0.1212	15	0
0.0987	3	0	0.1237	0	5
0.1012	0	8	0.1262	0	0
0.1037	0	6	0.1287	9	7
0.1062	9	8	0.1312	2	4
0.1087	0	7	0.1337	0	5
0.1112	12	0	0.1362	17	8
0.1137	0	5	0.1387	25	14

E=-0.1112 eV is the local extremum for stimulating effect on nervous system and improvement of nervous conductivity; E=-0.1212 eV is the local extremum for anti inflammatory effect; E=-0.1387 eV is the local extremum for inhibition of development of tumor cells of molecular level

Table 2. Mathematical model results of spectral analysis with methods NES of EVODROP water with author Fabio Hüther, Switzerland

-E(eV) x-axis	EVODROP® (%((-E_{value}) */ (-$E_{total\ value}$)**	Tap Water (control sample) (%((-E_{value}) */ (-$E_{total\ value}$)**	-E(eV) x-axis	EVODROP® (%((-E_{value}) */ (-$E_{total\ value}$)**	Tap Water (control sample) (%((-E_{value}) */ (-$E_{total\ value}$)**
0.0912	0	8.0	0.1162	0	0
0.0937	0	0	0.1187	2.8	8.0
0.0962	5.5	8.0	0.1212	13.9	0
0.0987	2.8	0	0.1237	0	8.0
0.1012	8.3	8.0	0.1262	0	0
0.1037	0	8.0	0.1287	11.1	4.0
0.1062	11.1	8.0	0.1312	4.5	4.0
0.1087	0	8.0	0.1337	0	4.0
0.1112	14.5	0	0.1362	11.0	8.0
0.1137	0	8.0	0.1387	14.5	8.0

** The result (-Evalue) is the result of hydrogen bonds energy for one parameter of (-E)*
*** The result (-Etotal value) is the total result of hydrogen bonds energy*

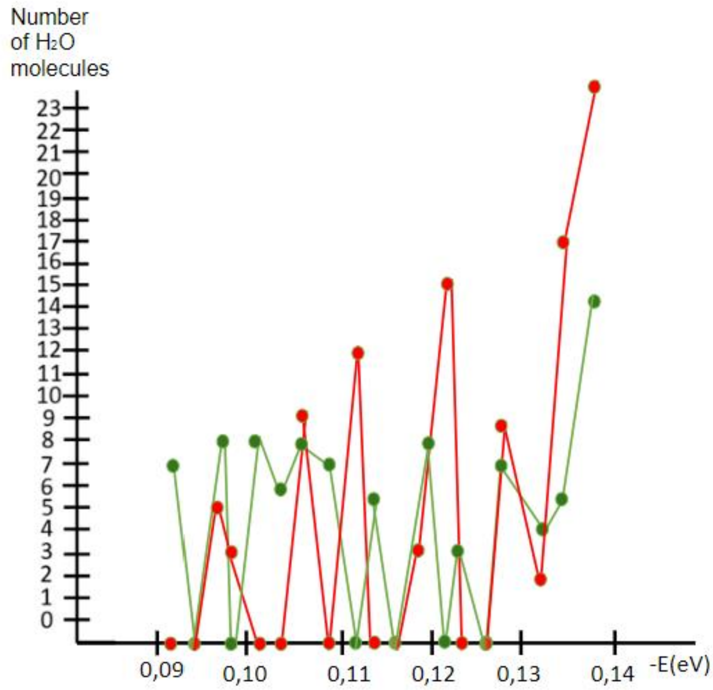

Fig. 1. Distribution of the number of water (H_2O) molecules in EVODROP water (red color) and tap water as control sample (green color) according to the energy of hydrogen bonds

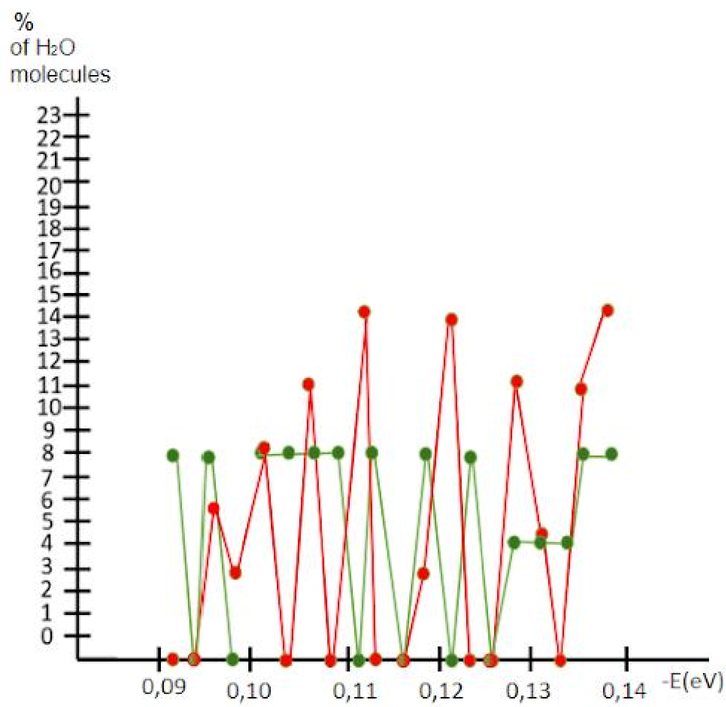

Fig. 2. Mathematical Model Results of spectral analyses with methods NES of EVODROP water (red color) and control sample of tap water (green color) with author Fabio Hüther, Switzerland

Table 3. Values of pH and ORP for EVODROP water

EVODROP water values	ORP (mV) sample EVODROP water	ORP (mV) control sample tap water	ORP (mV) sample minus control sample	pH sample EVODROP water	pH control sample tap water	pH Sample minus control sample
	+80	+320	-240	6.54	7.78	-1.24

3.2 Study of pH and ORP of Samples of EVODROP Water with Author Fabio Hüther, Switzerland

The research was performed from one of co-authors Georgi Gluhchev.

The obtained results are shown in the following Table 3.

3.3 Research of Hardness of EVODROP Water

The parameter of hardness of tap water from Zurich is 7.82±0.39 mgeqv/l. The hardness of EVODROP water is 7.02±0.35 mgeqv/l. The difference 7.82-7.02=0.8±0.04 shows effect of decreasing of hardness of tap water from the device for EVODROP water.

This effect is essential for human health for cardio vascular system.

4. CONCLUSION

The basic conclusion from the research is that EVODROP water increases the average energy of hydrogen bonds among water molecules treatment compared to the average energy of hydrogen bonds among water molecules in control sample of tap water.

The mathematical models of EVODROP water give significant information about the possible number of hydrogen bonds as a percent of H_2O molecules with different distribution of energy relative to the same number in control sample of tap water.

As a result of different energies of hydrogen bonds, the surface tension of EVODROP water is increased after the treatment relative to the control sample. This effect is connected with the preservation and increase in the energy of the biochemical processes between water molecules and biomolecules.

The following effects from the analysis of the local extremums in spectrum are valid:

1. Stimulating effect on nervous system and improvement of nervous conductivity
2. Anti inflammatory effect
3. Inhibition of development of tumor cells of molecular level

There is alkalization and increase in the number of free electrons in EVODROP water. These effects are essential for cellular metabolism.

Two of the authors (Ignatov and Gluhchev) suggest a mathematical model for the number of water molecules using the distribution of the hydrogen bonds energy E in the range (-0.0937 eV; 13.23 μm; 756 cm^{-1}) to (-0.1387 eV; 8.95 μm; 1117 cm^{-1}).

The measurements with spectral methods NES and DNES show significant difference between EVODROP water and control sample with tap water. The result for EVODROP water in the NES-spectrum is -0.1221 eV, while for control sample with tap water it is -0.1127 eV. The value of $\Delta E_{H...O}$ for EVODROP water measured by the DNES method are in the interval (-0.0094±0.0011 eV).

The highest local extremum for EVODROP water is 88.9 eV^{-1} at (-0.1362 eV; 9.10 μm; 1099 cm^{-1}) – (-0.1387 eV; 8.95 μm; 1117 cm^{-1}). This value is responsible for its antitumor effect.

The results from NES for $E_{H...O}$ and DNES for $\Delta E_{H...O}$ show that the angle of moisture at the EVODROP water is larger than the one at tap water (control sample).

The present investigation points at the relationship between the number of water molecules and the energy of hydrogen bonds, which may serve as a starting point for future research.

DISCLAIMER

The products used for this research are only for scientific purpose and they are not products of companies. There is absolutely no conflict of interests. The research was not funded by the producing company, rather it was funded by the authors themselves.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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