

The hypothetic structure of the Orgon-water

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I base my conceptions concerning the hypothetic structure of the Orgon-water on my experimental results with related calculations. I shall call it hypothetic because the structure of the water stays on submicroscopic level while the experiments have been carried out using macroscopic biophysical methods. It was János Kavalkó to place the Orgon-water at my disposal and in the experiments this water has been compared with the tapwater in Budapest. In my opinion, it is obvious to make an intercomparison by this way because the Orgon-water should be used in practice and in this case the measuring results haven't to be related to the parameters of a perfectly clear water.

Introduction

Water is a universal fluid covering more than two-thirds of the global surface. It assures ideal circumstances to the course of chemical processes and is one of the indispensable substances of the life. According to Oparin, also the origin of the life can be bound to the water. Water is the basic material of life – says Szent-Györgyi – participates in building up the living organisms as well as in processes taking here place on different levels.

In the biosphere, the water as an environmental factor is of essential importance which for the aquatic organisms is a medium and for the land structures it gets on through the water content of the soil and air.

Numerous experts suppose that the first living creatures evolved from the primordial ocean, evidenced by the fact that the extracellular fluid of the higher grade animals and that of the man preserves the print of the ionic composition of that time sea. Since Claude Bernard, the inner environment of the living structures becomes a determined role in the life reservation.

The structure of water

The water molecule is built up of two hydrogen atoms and one oxygen atom. The electron configuration of the oxygen atom is $(1s)^2(2s)^2(2p)^4$; which with the two electrons of the two hydrogen atoms are completed to a configuration number eight, and the two hydrogen nuclei as well as also the oxygen nucleus together with the $(1s)^2$ electrons is in a common cover consisting of the eight electrons. The X-ray diffraction analysis of the structure of the water molecule has revealed that it takes place in a triangular form.

The valency angles of the oxygen atom vary between $104-109^0$ depending on the state of matter, and the distance between the oxygen and the hydrogen is $0,96-0,99 \cdot 10^{-10}$ m. There is a strong covalent link the polar dipole momentum of which is 1,85 D, the relative dielectric constant of the water being 80.

By investigating the structure of the water molecule, one can see that this triangle corresponds to a segment passing through the centre of the tetrahedron where the oxygen takes place practically in the centre. The relative position of the water molecules to each other depends upon the state of the matter. The water in solid state as the ordinary ice crystallizes in hexagonal systems; every molecule connects with three molecules in the same layer and another one in the

neighbouring layer, the distance of the oxygen atoms between each other is $2,76 \cdot 10^{-10}$ m (cit. Bernal and Fowler). Every oxygen atom is connected with four hydrogen, two with covalent link and two with hydrogen-bridge link, the length of which is $1,74-1,8 \cdot 10^{-10}$ m.

Transport phenomena

The water is the constituent of any living organism and the fluid parts in it are considered as watery media ; in this point of view, it can be comprehended as a universal solvent for them. In the new-born child 70 per cent of the body is made up of water and that of the elderly is still more than 60 per cent, too. It is the biophysics to deal with the material and energy exchange in watery media in the framework of transport processes.

On transport phenomena we understand the change of the „generalized forces” in time and in space producing such fluxes for which the laws of the conservation are valid.

This general and scientifically exact definition of the transport phenomena includes all those phenomena which are ranged among this group as a rule. Accordingly, one can deduce: the phenomena of the mass transport (diffusion), that of the energy transport (heat conduction), the impulse transport (inner friction), the transport of the electric charge (electric conduction), as well as the cross-effects and even other transport phenomena.

This general definition of the transport phenomena enables to characterize quantitatively the settled exchanges which seemed to be an impossible postulate on the basis of the earlier determinations. If: W – the quantity of the transported parameter, K – a constant depending on the transport type and the quality of the transport parameter, dS – the surface on which the transport passes off, dt – the period of time of the transport process, $grad a$ – the generalized force, then the

quantity of the transported parameter (flux) is given by the following connection:

$$W = K \int_{t_1}^{t_2} \int_{S(x,y,z)} \text{grad } a \, dS \, dt$$

For the flux W , of course, the law of conservation is valid. If the transport process passes off in only one direction of the space, then we receive the following expression:

$$W = K \int_{t_1}^{t_2} \int_{x_1}^{x_2} \text{grad } a_x \, dx \, dt$$

from which we can receive through suitable substitutions the classic laws describing the particular transport phenomena.

We meet the different types of the transport phenomena in the following points.

Experimental parameters

It is commonly known that the water belongs to the anomalous fluids. The best known of its anomalies is the unusual increase of density by thawing as well as a further increase in density between $0 - 4$ °C. Besides, the water has other numerous peculiarities which depart from that of the normal fluids.

The specific heat of the liquid water is nearly double of the ice (in general the thawing will hardly alter the specific heat), the heat-dilatation coefficient of the water grows with that of the pressure between $0 - 45$ °C (with increasing

pressure the heat-dilatation coefficient will in general diminish), on the other hand in the same temperature range its compressibility decreases by getting warmer, also the dielectric constant and the velocity of its selfdiffusion changes abnormally.

A specialist, for the first glance, shall be of the opinion that we would better trying to examine the density change of the water in function of the temperature because the density is a simple physical parameter (mass in a unit of volume). Unfortunately, our knowledges in biophysics and physical chemistry are against this: the anomalous character of the water exists to some extent even because the density of the water is a composite parameter.

If we examine on the microscopic level it will be influenced by thermal motion of the molecules as well as the proportion of the hydrogen-bridge links and the common resultant of which will determine the density. On the basis of this conception, we have rejected the examination of the density.

In the case of the water we could have chosen among many parameters: specific heat, melting heat, heat of evaporation, thawing point, boiling point, coefficient of thermal conduction, velocity of sound in water, modulus of elasticity, compressibility constant, etc. In our opinion by determining the experiment, we had to concentrate to the watery media and here these are in movement and in superficial contact with their environment.

It followed from this train of thought that we had to concentrate on two parameters in the experiments and the related results are discussed now in this paper. The two parameters are as follows: The change of the internal friction coefficient and the surface tension of the water, both in the function of the temperature.

Knowing that the water is an anomalous fluid and its density on 4 °C is maximal, therefore, the temperature interval should be placed out of this range. We accepted for the lower limit of this interval the temperature of the tapwater

which we have found in general 12 °C. The upper limit of the temperature was accepted at 46 °C as the highest point of the physiological processes in the living organisms. It is well known that the majority of proteins suffers irreversible changes.

The Orgon-water was prepared from tapwater by the Kavalkó-apparatus according to his peculiar method while tapwater has been used always as the standard for intercomparison.

Viscosity

The internal friction (viscosity) is a quality of the substances being able to move with different velocity in layers related to each other. It is most characteristic in the fluid state but it will be often found also in gaseous state unlike solid bodies although in some amorph substances can be easily proved. As a matter of fact, the internal friction is nothing else but to tearing away the molecules from their mutual sphere of action, that is a macroscopic statement of the energy bent to overcome the existing intermolecular forces. In the case of real fluids there exists a cohesive power not only between their own molecules but we have to reckon with an adhesive force between the wall of the container and the fluid, too.

If the difference of the velocity $d\mathbf{v}$ related to one another of two parallel fluid layer of $d\mathbf{S}$ surface in a distance $d\mathbf{x}$ to each other then the friction power between the two layers is according to Newton's formula:

$$\vec{F} = -\eta \cdot \frac{d\vec{v}}{dx} \cdot dS$$

where η – proportionality factor is the coefficient of the internal friction; the larger the value of η the fluid is more viscous. The minus sign means that the

friction force is of opposite direction to that of the flow of the fluid. If we multiply the relation above with the length of time dt of the observation then

$$d\mathbf{p} = \mathbf{F} \cdot dt$$

equals the change of the impulse.

Therefore the internal friction is nothing but the impulse transport resulted on the action of the velocity gradient:

$$d\bar{p} = -\eta \cdot \frac{d\bar{v}}{dx} \cdot dS \cdot dt$$

The internal friction co-efficient is a constant characteristic of the fluid given in the international scale system in $[\eta] = \text{N.s.m}^{-2}$ units.

This co-efficient can be considered constant just in narrow temperature interval because it diminishes with the raise of the temperature. It is working like the movement of the molecules increases with higher temperature but the value of the intermolecular forces affecting between them decreases in the same time.

The experimental determination of the internal friction of the Orgon-water

The value of the internal friction co-efficient has been determined by means of a microviscosimeter as modified by Vincze which was based on the Ostwald's viscosimeter. The microviscosimeter is a curved glass tube on one upper stem of which above there is an expansion, the subjacent part of the tube is a capillary. Under and above the expansion you find a constant volume marked by carved signs. Into the expanded part we suck up the fluid under study and the length of time will be measured necessary to flow through the capillary, due to its own weight, into the lower receiver in the other stem.

This viscosimetric determination is based on Poiseuille's law, the short deductive demonstration of which is given here:

Supposed that a viscous fluid is flowing through a capillary of z length and r radius, mark with v the flow velocity in a distance y from the longitudinal axis of the cylinder. It is presumed that the value of v for a given value of y is the same in the adequate points of the fluid; in other words, the flowing velocity is constant in the same distance from the axis. Theoretically, let's delimit an elemental cylindrical subspace from the flowing fluid along the longitudinal axis, then in accordance with Newton's law the friction force on the surface of the cylinder is as follows:

$$\mathbf{F} = -\eta \cdot 2 \cdot \pi \cdot y \cdot z \cdot \frac{dv}{dy}$$

In the case of stationary flow, the friction force \mathbf{F} will be equalized by the pressure difference (Δp) acting on the bases of the cylinder

$$-\eta \cdot 2 \cdot \pi \cdot y \cdot z \cdot \frac{dv}{dy} = \Delta p \cdot \pi \cdot y^2$$

or

$$dv = -\frac{\Delta p}{2 \cdot \eta \cdot z} \cdot y \cdot dy$$

By integration we get:

$$v = -\frac{\Delta p}{2 \cdot \eta \cdot z} \cdot \frac{y^2}{2} + C$$

where C is the integration constant. On the basis of the limit conditions the value of C can be proved, presumed that the flowing velocity the capillary wall ($y = r$) is zero. Hence C :

$$C = \frac{\Delta p}{2 \cdot \eta \cdot z} \cdot \frac{r^2}{2}$$

and so

$$v = \frac{\Delta p}{4 \cdot \eta \cdot z} \cdot (r^2 - y^2)$$

This relation gives the distribution of the flowing velocity if the viscous fluid streams in a capillary tube. On the basis of this it's easy to determine the quantity of the streaming fluid (**q**) in the unity of time. Evidently we get:

$$q = \int_0^r v \cdot 2 \cdot \pi \cdot y \, dy$$

Substituting the value of *v* and completing the integration we reach to Poiseuille's law:

$$q = \frac{\pi \cdot r^4 \cdot \Delta p}{8 \cdot z \cdot \eta}$$

If the flow – on the effect of the hydrostatic pressure – will be taken $\Delta p = \rho \cdot g \cdot h$, and for an optional Δt time interval, then the volume of the flowing fluid (**q_v**) will be given with the following relation:

$$q_v = \frac{\pi \cdot r^4 \cdot \rho \cdot g \cdot h \cdot \Delta t}{8 \cdot z \cdot \eta}$$

In the knowledge of the parameters in the formula, the value of the internal friction constant of the fluid (**η**) can be determined.

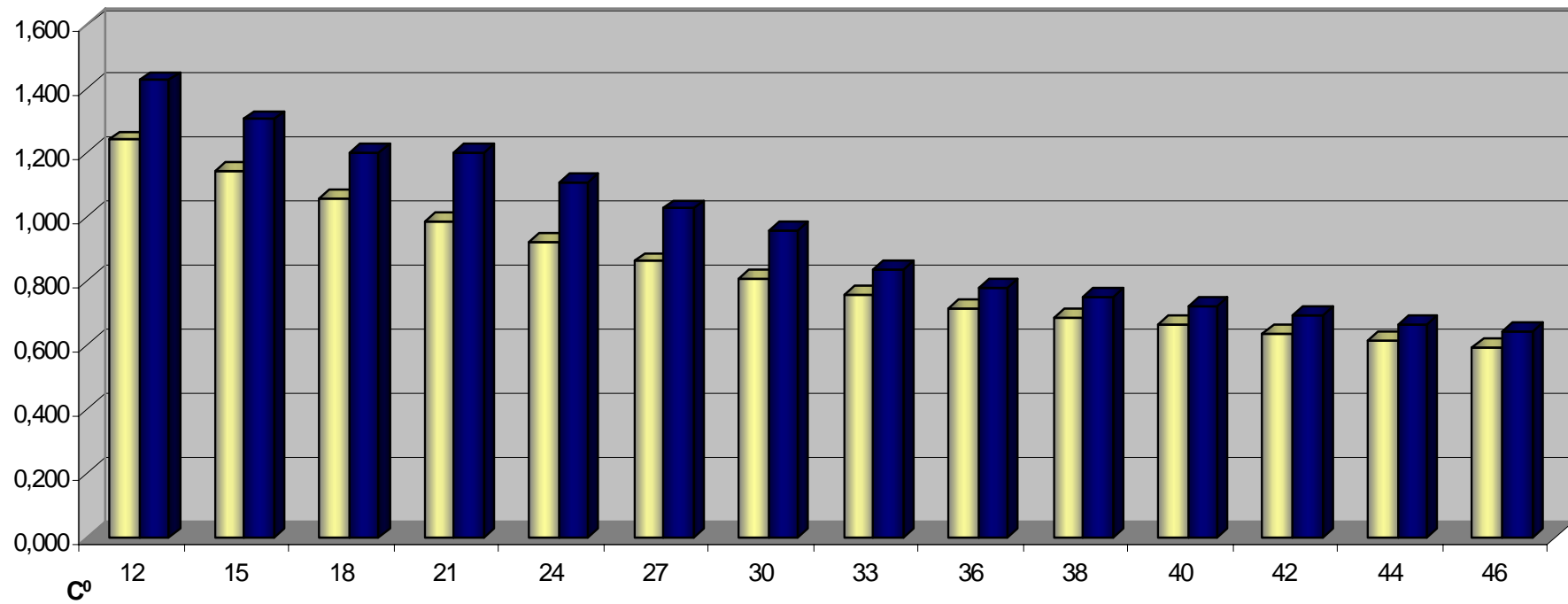
Experimentally measured internal friction values

The internal friction measurements have been carried out as from 12 °C to 36 °C by three degrees and from here by two degrees up to 46 °C. On every temperature value 30 experiments were performed. By a given temperature, the

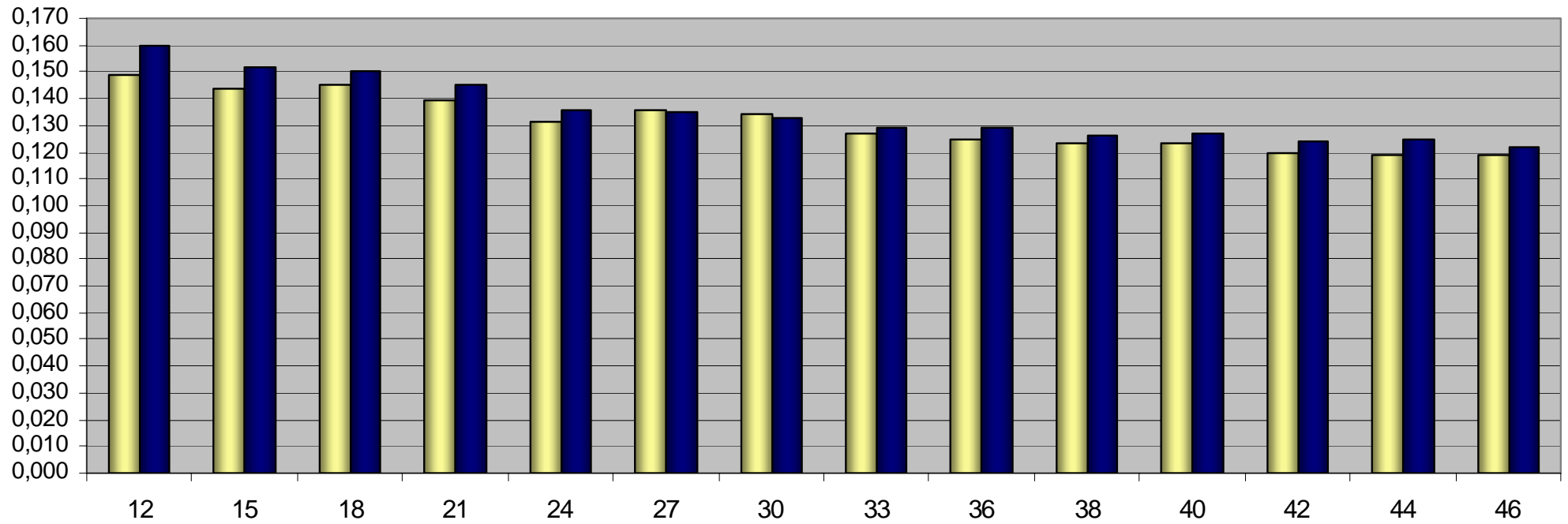
mathematical average and the standard deviation of the measured values were calculated. These measurements were carried out both with the Orgon-water and with tap water. Measured and calculated values are seen on the table below.

Temperature °C	Tap-water		Orgon-water	
	internal friction constant η ($\times 10^{-3}$ N.s/m ²) n = 30	Standard deviation (\pm) ($\times 10^{-3}$)	internal friction constant η ($\times 10^{-3}$ N.s/m ²) n = 30	Standard deviation (\pm) ($\times 10^{-3}$) significance
12	1,240	0,149	1,427	0,160 (e.sz.)
15	1,145	0,144	1,305	0,152 (v.s.)
18	1,060	0,145	1,201	0,150 (v.s.)
21	0,986	0,139	1,201	0,145 (v.s.)
24	0,920	0,131	1,108	0,136 (v.s.)
27	0,861	0,136	1,026	0,135 (v.s.)
30	0,808	0,134	0,955	0,133 (v.s.)
33	0,759	0,127	0,834	0,129 (v.s.)
36	0,714	0,125	0,781	0,129 (v.s.)
38	0,686	0,123	0,752	0,126 (v.s.)
40	0,662	0,123	0,719	0,127 (v.s.)
42	0,637	0,120	0,692	0,124 (v.s.)
44	0,614	0,119	0,666	0,125 (v.s.)
46	0,593	0,119	0,643	0,122 (v.s.)

Internal friction constant η ($\times 10^{-3}$ N.s/m²)
Tap-water- Orgon-water



Standard deviation (\pm) ($\times 10^{-3}$)
Tap-water- Orgon-water



In the previous table every value of the internal friction co-efficient contains the mathematical mean of 30 experimentally measured values. Because of the statistical requirements it is necessary to keep this number of the physical parameters in order to diminish the scattering, and the average should express more exactly the values characterizing the sample. We reduced by this way the experimental failures where inaccuracies are unavoidable. The two series of samples have been intercompared on the basis of the Student's t-distribution on every temperature grade and the calculations have shown that the internal friction co-efficient of the Orgon-water in the given temperature interval is very significantly (v.s. 0,1%) greater than in the case of the tapwater.

Surface tension

In a fluid between the molecules, within a distance of some molecules, inside the so-called action sphere there are cohesive forces to act. Between molecules possessing permanent dipole momentum arises the so-called orientation effect, between those polarizing each other mutually arises the inductive effect. In case of the water also the hydrogen-bridge binding plays a significant role.

Molecules within the action sphere exert force on the molecule inside the fluid from every side, and the resultant of these is zero. The resultant, however, of the cohesive forces acting on the molecules in the superficial layer of the fluid is not zero because the molecules falling in a part of the action sphere exert a force towards the inside of the fluid and this force tries to diminish the surface of the fluid to a minimum. If we want to increase this surface we have to do

work against the force towards the inner fluid. This work to be done for enlarging the surface by 1 m^2 is called surface tension (σ) that is

$$\sigma = W/A$$

where W is the work, A the unit surface. The unit of measure of the surface tension (σ) is N/m. It appears on every edge surface and prevents the molecules of the dissolved substance to pass from one phase to the other.

The experimental determination of the surface tension of the Orgon-water

Measuring the surface tension can happen with different methods of which we have chosen the dropping one. The measuring instrument of the dropping method is the Traube's stalagmometer. This is a capillary tube with the aperture polished to plain, from which the fluid drips out slowly. Because of the small flow velocity, the moving energy of the drop is negligible so the drop at the lower end of the instrument comes off only when its weight equalizes the surface tension. The radius of the tube r , the surface tension of the fluid σ , the mass of one drop m , then the drop breaks off when the weight of the drop is equal to the surface tension force acting on the circumference of the rim...

$$2\pi r\sigma = mg \cdot \rho$$

Measuring the mass of each drop would be very circumstantial, therefore, instead of their direct measurement we determine their average mass. The volume (V) between the two marks of the stalagmometer will be multiplied with the density (ρ) of the fluid and divided by the number (N) of the drops from the fluid. The average mass of one drop is:

$$m = \rho \cdot V/N$$

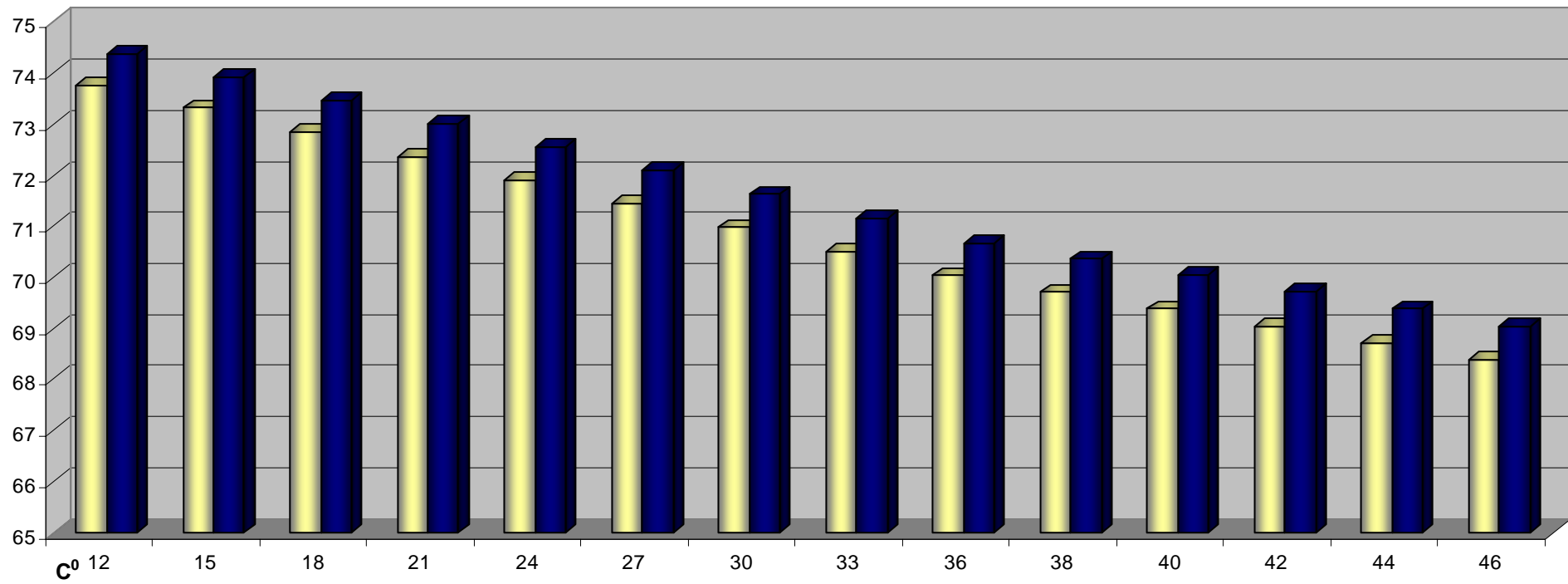
The measuring of σ in the equation is complicated; we don't need it if we calculate with relative surface tension which is usually enough. This later one is a ratio which says: how many times the surface tension of a certain fluid is given in that of another fluid.

Experimentally measured surface tension values

The surface tension measurements have been carried out as from 12 °C to 36 °C by three degrees and from here by two degrees up to 46 °C. On every temperature value 30 experiments were performed. By a given temperature, the mathematical average and the standard deviation of the measured values calculated. These measurements were carried out both with the Orgon-water and with tap water. Measured and calculated values are seen on the table below.

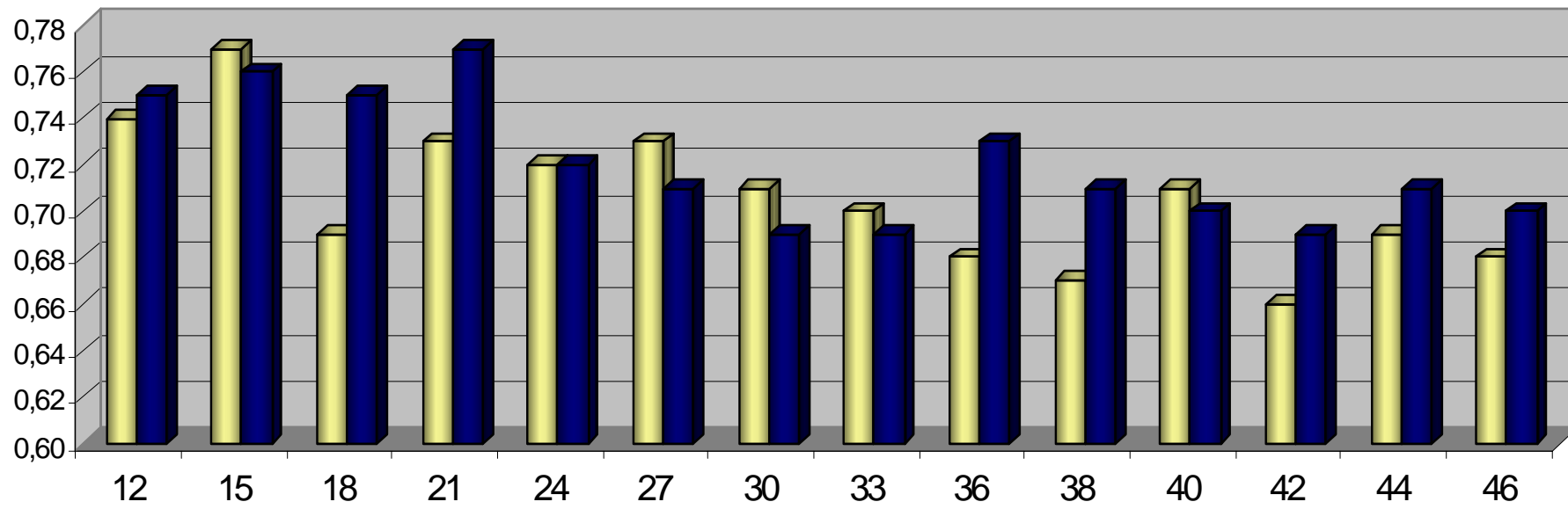
Temperature C ⁰	Tapwater		Orgonwater	
	Surface tension. constant σ (x 10 ⁻³ N/m) n =30	Standard deviation (\pm) (x 10 ⁻³)	Surface tension constant σ (x 10 ⁻³ N/m) n = 30	Standard deviation (\pm) (x 10 ⁻³) signif.
12	73,77	0,74	74,39	0,75 (sig.)
15	73,32	0,77	73,93	0,76 (sig.)
18	72,84	0,69	73,46	0,75 (sig.)
21	72,37	0,73	73,01	0,77 (sig.)
24	71,91	0,72	72,56	0,72 (sig.)
27	71,46	0,73	72,10	0,71 (sig.)
30	70,98	0,71	71,63	0,69 (sig.)
33	70,51	0,70	71,16	0,69 (sig.)
36	70,03	0,68	70,68	0,73 (sig.)
38	69,71	0,67	70,36	0,71 (sig.)
40	69,38	0,71	70,04	0,70 (sig.)
42	69,04	0,66	69,72	0,69 (sig.)
44	68,71	0,69	69,38	0,71 (sig.)
46	68,38	0,68	69,04	0,70 (sig.)

Surface tension constant σ ($\times 10^{-3}$ N/m) $n = 30$
Tap-water- Orgon-water



Surface tension constant σ ($\times 10^{-3}$ N/m) $n = 30$

Tap-water- Orgon-water



With the surface tension experiment, the error is of higher degree because the number of the drops must be a whole number only. The two series of samples have been intercompared on the basis of the Student's t-distribution on every temperature and calculations have shown that the surface tension constant of the Orgon-water in the given temperature interval is significantly (sig.: 1%) greater than in the case of the tap-water.

Molecular structure

As the closest approximation, the water is composed of two hydrogen and one oxygen atoms. If we consider the water molecule as a thermodynamic system then it is a three-atomic molecule in which the space co-ordinates of the oxygen atom are $O(x_1, y_1, z_1)$, while those of the hydrogen atoms are $H(x_2, y_2, z_2)$, $H(x_3, y_3, z_3)$. The water-molecule takes place in a triangular shape, therefore, if we take 3 from its 9 space co-ordinates then the number of the freedom degree (grade) of the water molecule is 6.

The translation energy of the molecule can be considered as outer energy, to this belonging three freedom grades. The rotational and vibrational energy within the complicated molecular structure we call inner energy, to the three-atomic water molecule belong three rotational and vibrational freedom grades. The proportion of the molecules excited to rotational and vibrational energy states depends on the temperature only. It needs certain time to take up the state of equilibrium determined by the temperature. The process for the development of the equilibrium is characterized by the relaxation time and our experiments justify that this state of equilibrium is more stable in the molecule of the organ-water than in that of the standard one.

Knowledges in molecular physics, the existence of isotopes and the experimental investigation of the water have proved that there exist 18 sorts of water molecules because 3–3 isotopes of the hydrogen as well as of the oxygen each of them separably participate in creating 1–1 water molecule. The isotopes of the hydrogen are: $^1\text{H}_1$ deuterium ($^2\text{D}_1$) tritium ($^3\text{T}_1$), while those of the oxygen are: $^{16}\text{O}_8$, $^{17}\text{O}_8$ és $^{18}\text{O}_8$.

Even when the ratio of the two isotopes of higher atomic weight of both the hydrogen and the oxygen in the water is extremely small, the so existing other 17-kinds of water-molecules, as related to the classic, $^1\text{H}^1\text{H}^{16}\text{O}$, create such nodes which change the intermolecular forces between the water molecules and

by this means they take up different spacial formation. Their presence reflects a natural condition and they may essentially contribute – also from several more points of view – to the anomalous behavior of the water.

	¹⁶ O	¹⁷ O	¹⁸ O
¹ H ; ¹ H	¹ H ¹ H ¹⁶ O (18)	¹ H ¹ H ¹⁷ O (19)	¹ H ¹ H ¹⁸ O (20)
¹ H ; ² D	¹ H ² D ¹⁶ O (19)	¹ H ² D ¹⁷ O (20)	¹ H ² D ¹⁸ O (21)
¹ H ; ³ T	¹ H ³ T ¹⁶ O (20)	¹ H ³ T ¹⁷ O (21)	¹ H ³ T ¹⁸ O (22)
² D ; ² D	² D ² D ¹⁶ O ¹⁶ (20)	² D ² D ¹⁷ O (21)	² D ² D ¹⁸ O (22)
² D ; ³ T	² D ³ T ¹⁶ O (21)	² D ³ T ¹⁷ O (22)	² D ³ T ¹⁸ O (23)
³ T ; ³ T	³ T ³ T ¹⁶ O (22)	³ T ³ T ¹⁷ O (23)	³ T ³ T ¹⁸ O (24)

As compared to the classic molecular weight (18) that of the other 17 water molecular weight is greater by 5,5–33,3% which is significant from the point of view of the dimension of the different forces to come about. So, there evolve „swarms” of 60–80 in the struture of the water the central core of which is one of the 17 other molecules of greater mole or other molecules and impurities to be found in the water.

The formation of such „swarms” is indirectly verified also by our results measuring the viscosity and the surface tension. At the same time, we have to take into account the existence of the hydrogen-bridges, too. In this respect the water molecule may occupy one of five spatial positions: 4, 3, 2, 1 or with one of no one single hydrogen-bridge link should it be bound to the neighbouring molecules. It is interesting to sketch out the percentual distribution of the water molecules in different hydrogen-bridge links as the function of temperature.

The percentages of the broken hydrogen-bindings
the water molecules to their neighbours 0–4
in function of the temperature

Temperature °C	n ₄	n ₃	n ₂	n ₁	n ₀
0 (water)	72,4	20	6,0	1,5	0,1
25	67,0	23,2	7,6	2,0	0,2
60	58,5	25,8	11,0	3,8	0,9

The existence of the hydrogen-bridge links is also a prove of the existence of swarms because for a water molecule to be bound to four neighbouring molecules in 67 per cent is only possible – according to our calculations – if larger swarms of 60–80 molecules and smaller ones of 20–25 members should be found continuously besides the independent reliant ones. The organ-water, due to the production technics, advances the stability of the conservation of the swarms; the temperature-dependence of both the internal friction co-efficient and the surface tension relates that these values are higher than those of the standard water.

Theory of the alternating swarms

From the temperature dependent change of the surface tension you can draw conclusions on the molecular state of the water. The relation between the surface tension measured on T temperature, the molar volume of the fluid and the temperature is given according to the Eötvös-rule:

$$\sigma \cdot V^{2/3} = k \cdot (T_{kr} - T)$$

where T_{kr} is the critical temperature of the fluid, k is the Eötvös's constant of the fluid. In our case the subnormal value of the Eötvös-constant can be interpreted by the larger molar volume because the molar weight of the existing 17 kinds of water molecules is greater this could be explained as well as by a higher associated state referring to the higher stability of the swarms.

Accordingly, the disposition the associated state in the orgon-water is higher. We have to know, however, that the thing is not any „chemical” association corresponding to the stoichiometric rules but the formation well-ordered zones of various size which continuously arise and desintegrate.

Final conclusions

The orgon-water is characterized by alternating swarms of greater numerosity and stability than that of the standard water.

Apart from the above described physical tests on the orgon-water, we have inevitably faced some practical questions, too.

From the point of view of the living organism it means that all those who get their watery-soluble constituents through orgon-water are more structured.

Let's emphasize the fact that the orgon-water can be preserved far better than the tap-water as our usual standard under the same circumstances, i.e. it's lasting significantly better.

The osmotic effect caused by the consumption of the orgon-water will locally reduce the inflammation and (consecutive) oedema.

The permeability of the cell membrane is increasing, and hence, the metabolic processes need less energy a investement.

Orgon-water intensifies the renal function as a result of the increased water –resuction in the Henle-section of the nephron.

They get nearer to their own normal homeostasis and needs less energy investment on organ-, tissue- and cellular level to preserve the healtly, normal functioning because the permeability of the orgon-water, as an universal solvent claims fewer base energy.

The organism is able to utilize the excess-energy during the mental activity, in the physical effort; to overcome stress conditions and also in disease states it can make use of the energy reserves of the organisms with greater effectivity.

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