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INFLUENCE OF THE UNFROZEN MAGNETIZED WATER ON JUICES

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Abstract. Influence of magnetic field on water has been described in the paper. The patented device constructed on the basis of a stator of three-phase asynchronous motor has been used for processing of water in the experiments.

It has been found that the water, processed in the electromagnetic field contains less mineral salts, has bigger cell permeability, and is characterized by falling of reduction-oxidation potential, and also by decreasing of electromotive force of the system. Electro physical indices may be used for rapid estimation of sanitary effect of water which is processed in the rotating magnetic field, and it is used for dilution of fresh-squeezed juices. Such juices have more positive action on a human body in comparison with non-diluted ones.

The electromotive force of the system, which correlated with the value of reduction-oxidation potential of the system, has been measured. The decreasing of electromotive force confirms the sanitary effect of pure magnetized water, as well as the mix of fresh-squeezed juices with magnetized water. One of the main disadvantages, which interferes with wide introduction of magnetized water into the institutions, which are not equipped with special equipment, is the gradual loss of the obtained by the water properties with time. The results of the investigation show that the water threatened by electro magnetic field after freezing, low-temperature storage, and defrosting, preserves the obtained properties for a long time. It has been shown in the paper, that application of defrosted magnetic water for germination of seeds accelerates the processes of growth. Diluting of juices, such as apple, carrot, beat, and ash berry ones, by magnetized water, reduce of electro physical indices.

Key words: magnetized water, magnetic field, device for electromagnetic treatment of water, freezing of water, apple juice, carrot juice, beat juice, ash berry juice.

ЗБЕРЕЖЕННЯ ВЛАСТИВОСТЕЙ ОМАГНІЧЕНОЇ ВОДИ ЗАМОРОЖУВАННЯМ

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Анотація. Надано характеристику впливу магнітного поля на воду. Встановлено, що вода, оброблена у електромагнітному полі, характеризується зниженням окисно-відновного потенціалу та електрорушійної сили системи. Електрофізичні показники можуть бути використані для експрес-оцінки оздоровчої дії води, обробленої в обертовому магнітному полі, що використовується для розведення свіжовичавлених соків. Одним з істотних недоліків, що перешкоджають широкому впровадженню омагніченої води в закладах не оснащених спеціальним устаткуванням, є поступова втрата нею властивостей. Наведені результати свідчать, що оброблена електромагнітним полем вода після заморожування, низькотемпературного зберігання та розморожування зберігає набуті властивості не менше місяця. Показано, що використання розмороженої омагніченої води для пророщення насіння гороху прискорює ростові процеси, а розведення нею соків: яблучного, морквяного, бурякового та чорноплідної горобини супроводжується зниженням електрофізичних показників.

Ключові слова: омагнічена вода, магнітне поле, установка для електромагнітної обробки, заморожування води, яблучний сік, морквяний сік, буряковий сік, сік чорноплідної горобини.



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Introduction. Formulation of the problem

Water is the main component to dissolve biologically active organic and inorganic agents of juice. Electromagnetic processing breaks down minerals of water improving its electro physical indicators, cell permeability and resulting in a better physiological influence of drinks containing magnetic water [1]. A gradual water disbenefit is a significant limitation for

the widespread use of water conditioned by electromagnetic fields.

Retaining properties acquired by water after an electromagnetic conditioning is another problem [2].

Analysis of recent research and publications

Magnetic water treatment helps better assimilation of juices, cocktails and drinks that are used in a

healthy diet. When watered down fresh squeezed juices demonstrate a more positive effect on human body [3].

Many scientists searched for a definitive criterion of water affecting the quality of juices [4–7]. The issues whether electromagnetic fields are safe for living bodies is one of the most important. The monograph of T. V. Kaplina [8] represents the results of influence which magnetic water had with rats during three months. An internal analysis (salivary gland, thymus gland, lungs, heart, stomach, pancreas, kidneys, adrenal glands, spleen, testicle, brain) showed no negative effect of the food containing magnetic water consumed by the animals. The study was carried out in the Applied Research Laboratory of the Poltava Consumer Cooperation University. The positive effect of magnetic water treatment on the cell permeability was confirmed in an article of M.M. Desnytska, A.V. Kargapolov, T.P. Rukhina [9].

According to A.H. Myrzadzhanzade, S. Kolokoltsev, O.L. Buchachenko, R.Z. Sagdeev, K. M. Salikhov [10], the magnetic treatment orders the molecular structure of water which is characterized by an interaction of two or more atoms. The movement of electrons must be correlated to ensure a sustainable and stable interatomic binding, i.e. the oscillation of electron orbits should be synchronized for interacting atoms. Such an oscillation synchronicity indicates the presence of dispersive interactions between atoms. Dispersive forces are electromagnetic and quantum in nature, a variety of intermolecular interactions, the so-called van der Waals forces. These forces arise from the in-phase oscillations of electrons of neighboring atoms or molecules, resulting in an interatomic or intermolecular attraction and binding.

Magnetic field effect on the two adjacent molecules, resulting in their oscillative motion of own frequency. The electron orbits of these two particles begin to oscillate with the same Larmor frequency along parallel axes right after the magnetic field is applied. The electron orbits of different particles have at least one common Larmor frequency. The oscillation gets partial time and spatial synchronization so a dispersive link may occur between the molecules. The necessary condition for the equality of the three frequencies is that the self oscillation frequencies of two nearby molecules must be equal to each other and to the Larmor frequency at same time. The old bindings begin to destroy and numerous new ones arise affecting every molecule and every atom, and forming a new structure.

It is known that magnetic fields are of an extreme nature. The stronger is the magnetic field the higher is the Larmor frequency, which is linear dependant from the magnetic field strength. In addition, molecules have a continuous frequency spectrum. Therefore, the equality of the three frequencies is possible only for certain values of the magnetic field strength. This explains why the magnetic water treatment polyextremally depends on the magnetic fields strength.

A visible effect of weak magnetic fields (for example, 10–30 kA/m) on aqueous solutions and biological objects can be explained by the fact that molecules of such substances, especially organic, are very massive and their own frequency spectrum is low and ultralow. This means that the equality of the three frequencies is most likely to happen with weaker magnetic fields, which are set up by low Larmor frequencies.

A number of theoretical and experimental studies has shown the usefulness of water treatment with the magnetic field strength from 30 to 60 kA/m, realized during the studies.

The purpose of the work is to study the influence of low-temperature processing of on the physiological activity and the electromotive force of magnetic water, correlating with the oxidation-reduction potential.

Tasks:

determination of the electromotive force for the systems containing freshly squeezed juices and magnetic water processed under low temperatures;

- magnetic water influences determination over the functionality of human and plant bodies.

Research Materials and Methods

An installation made in accordance with a Ukrainian patent was used for the magnetic water treatment [11]. The installation (Fig. 1) consists of Stator 1 of a three phase asynchronous motor (without rotor) powered through Voltage Regulator 2 from three-phase electrical mains. In accordance with the Exponential Law Voltage Regulator 2 provides with a maximum magnetic field strength on the internal surface of Stator 1 and with its minimum in the center of the Stator (Fig. 2) Vessel 3 made of dielectric material is installed in the middle of Stator 1. The outer diameter of Vessel 3 is equal to the internal diameter of Stator 1. Flat electrodes 4 made of juice-inert conductive materials (for example, stainless and non-magnetic food steel) are installed on the opposite sides of Vessel 3. Electrodes 4 are connected to Electromotive Force Indicator 5 (for example, an oscilloscope), which measures the electromotive force exerted by the rotating magnetic field of Stator 1 on Electrodes 4.

Prefiltered water from the Odessa municipal water supply system was used for the electromagnetic processing. After the electromagnetic processing the water was packaged in perforated containers and treated at minus 18°C. The frozen water in the form of ice cubes of different sizes was stored during one month. Apple, carrot and chokeberry fresh squeezed juices were used in the study.

Magnetized water obtaining. A 50 cm³ dielectric cylindrical vessel with drinking water was placed in Stator 1 (see Fig. 1) and a magnetic field strength of 40–80 kA/m was adjusted using Voltage Regulator 2. The magnetic field strength was measured by an am-

peremeter due to its value is directly proportional to the current in the winding of the Stator.

The 50 cm³ vessel with treated in this way drinking water was then placed in a freezer and frozen into solid ice. The frozen magnetic water was stored in the freezer during one month. Then, the vessel was taken out of the freezer and the water defrozen at room temperature.

Preparation of juices from magnetized water.

The defrozen magnetic water was mixed with fresh

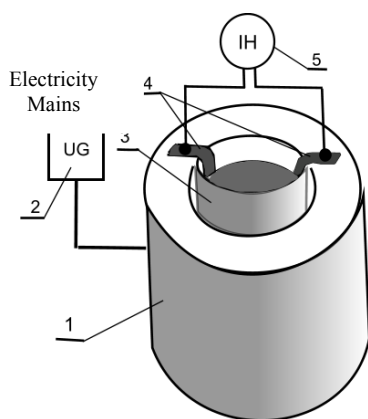


Fig. 1 Magnetic Water Treatment Installation

Calculation of electromotive force. The EMF of water and juice was calculated based on the magnetic strength change rate by the formula (1) [12]:

$$E = -W \frac{d\Phi}{dt}, mV \quad (1)$$

where *W* is the number of winding turns, which create the magnetic field;

Φ is the magnetic flux created by the device, mV;

$\frac{d\Phi}{dt}$ is the magnetic strength change rate, mV·sec⁻¹.

The EMF will depend not only on the environment (for example, the type of juice), where the magnetic field is created, but on the speed with which the magnetic flow changes.

When changing the current within the range 0.2–0.8 A the maximum strength (max) changes within 40–140 kA/m and the minimum (min) within 10–50 kA/m.

A complete scientific rationale for the magnetic field influence, resulting in the application of the above parameters, information retrieving and author's research allow to state that such food system exerts a positive influence on human body.

Magnetized water influence on the blood glucose level and insulin secretion in humans. The study took place in the Arcadia Clinical Sanatorium, the State Border Guard Service of Ukraine, Odessa. In order to support the objectives a clinical and functional

squeezed juices at the ratio: 1 part of magnetic water to 3 parts of fresh squeezed juice. The EMF of the obtained juice drinks was measured by Digital Millivoltmeter 5. The values were measured twice: for the fresh squeezed apple juice not watered down with drinking water, and for the fresh squeezed apple juice watered down with the defrozen magnetic drinking water.

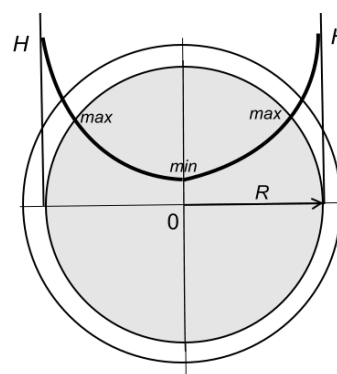


Fig. 2 Changing the Magnetic Field Strength inside the Stator in accordance with the Exponential Law

examination and health-clinical treatment was carried out with participation of 45 patients from 51 to 75 years old manifesting different metabolic syndrome. 25 patients formed a primary group and were treated with phyto tea no. 8 “cleaning phyto”, brewed using the drinking water prepared on the above described installation. A control group included 20 patients who consumed a similar tea brewed using the drinking water not influenced by the electromagnetic field. The course of treatment was 21 days. The level of glucose and insulin was determined upon Fisher and Student's variance ratio [13].

Magnetized water influence on the functional activity of sprouting pea. The growth of pea seed germs was determined after being soaked in water, treated with the electromagnetic field using the above described technique both with and without freezing.

Results of the research and their discussion

The electromagnetic treatment of juices, as well as watering them down with magnetic water, changes the properties of the system and reduces the EMF, enhancing the sanative effect of the product for human body. Watering juiced with magnetic water reduces the glycemic index and load, as well as boosts the activity of ions which can be determined through the index of electromotive force (EMF), correlating with the oxidation-reduction potential of the system [2]. The research results are shown in Table 1.

Table 1 – The EMF of fresh squeezed juices with and without magnetic water

Juice	EMF, mV					
	Watered down		Watered down with magnetic water		Watered down with defrozen magnetic water	
	non-magnetic	magnetic	non-magnetic	magnetic	non-magnetic	magnetic
Apple	28.3	21	25	19.8	21	17
Carrot	45.6	36.7	44.2	35.5	41	29.3
Beet	39	32.2	37.3	30.5	34.3	21.3
Chokeberry	74.3	49	66.7	48.4	49	31

The data in Table 1 show that watering juices down with untreated water at the ratio 1:3 helps reducing their EMF by: 11.6% for apple, 21.1% for carrot, 21.7% for beet and 34.8% for chokeberry juice. The EMF suffers additional reduction by: 16% for apple, 10.3% for carrot, 16.7% for beet and 36.2% for chokeberry juice accordingly when using defrozen magnetic water.

The clinical study of the properties of frozen magnetic water has not uncurtained any significant changes in the level of glucose with the treated patients. At the same time the level of insulin has undergone substantially, allowing reducing the HOMA-IR index. This especially concerns patients with initial hyperinsulinemia, whose insulin level reduced by 1.6. It must be noted that this was not visible in the control group (which patients were not treated with phyto tea

no. 8 ‘cleaning phyto’ made using Tzarytsa Vodytsa™ purified drinking water, treated by EMF).

Such a pronounced effect of phyto tea, brewed using electromagnetic drinking water, as the hole punch medical factor on the dynamics of the of insulin resistance syndrome, can be explained by the fact that the electromagnetic water treatment helps reducing the oxidation-reduction or the redox potential and has recovery properties. Magnetic water helps biologically active substances to better penetrate in body cells and has a high antioxidant activity, which conduces to the entire body health improvement at the cellular level, as well as patients’ life quality.

The activity of defrozen water was also determined by using magnetic and non-magnetic water for pea seed sprouting (Fig. 3).



Fig.3 – The growth of pea seed germs being soaked in water: M - treated with the electromagnetic field without freezing; M3 - treated with the electromagnetic field after freezing ; H - control sample, not treated

The melt water treated in the electromagnetic installation before freezing-defreezing boosts biological awakening of seeds. The germination of pea samples showed that in the frozen state the magnetic water could preserve its properties for a long period of time. Using fresh magnetic or recovered frozen magnetic water accelerates growth processes in seeds comparing with untreated water.

Other studies [14] show that frozen magnetic water can preserve its properties during an indeterminate period of time. The fact is an interesting phenomenon that not all the water mass but only its part must be treated due to the untreated water acquires properties of the treated one when interflowing.

Conclusions

We have frozen the activated water in order to extend the duration of its physiological action.

1. A short-term electromagnetic water treatment (up to one minute) at 10–50 kAa/m allows to improve the cell permeability and to reduce the electromotive force, indicating a better physiological action.
2. Watering apple, carrot, beet or chokeberry juices down with frozen magnetic water improves digestion.
3. Frozen magnetic water can be used as ice cubes for a long time, which allows introducing new technologies in various enterprises avoiding extra charges for magnetic water treatment installations.

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СОХРАНЕНИЕ СВОЙСТВ ОМАГНИЧЕННОЙ ВОДЫ ЗАМОРАЖИВАНИЕМ

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Аннотация. Описано влияние магнитного поля на воду. Установлено, что вода, обработанная в электромагнитном поле, имеет меньший размер минеральных солей, большую клеточную проницаемость и характеризуется снижением окислительно-восстановительного потенциала и электродвижущей силы системы. Электрофизические показатели могут быть использованы для экспресс-оценки оздоровительного действия воды, обработанной во вращающемся магнитном поле, которая используется для разведения свежавыжатых соков. Такие соки обнаруживают более позитивное действие на организм человека сравнительно с неразведенными.

В работе измеряли электродвижущую силу системы, которая коррелирует со значением окислительно-восстановительного потенциала системы, снижение которого свидетельствует об оздоровительном действии омагниченной воды и разведенных ею свежавыжатых соков. Одним из существенных недостатков, которые препятствуют широкому внедрению омагниченной воды в заведениях, не оснащенных специальным оборудованием, является постепенная потеря ею приобретенных свойств. Результаты исследований свидетельствуют о том, что обработанная электромагнитным полем вода после замораживания, низкотемпературного хранения и размораживания, сохраняет приобретенные свойства не меньше месяца. Показано, что использование размороженной омагниченной воды для проращивания семян гороха ускоряет ростовые процессы, а разведение ею соков: яблочного, морковного, свекольного и черноплодно-рябинового сопровождается снижением электрофизических показателей.

Ключевые слова: омагниченная вода, магнитное поле, установка для электромагнитной обработки, замораживание воды, яблочный сок, морковный сок, свекольный сок, сок черноплодной рябины.

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