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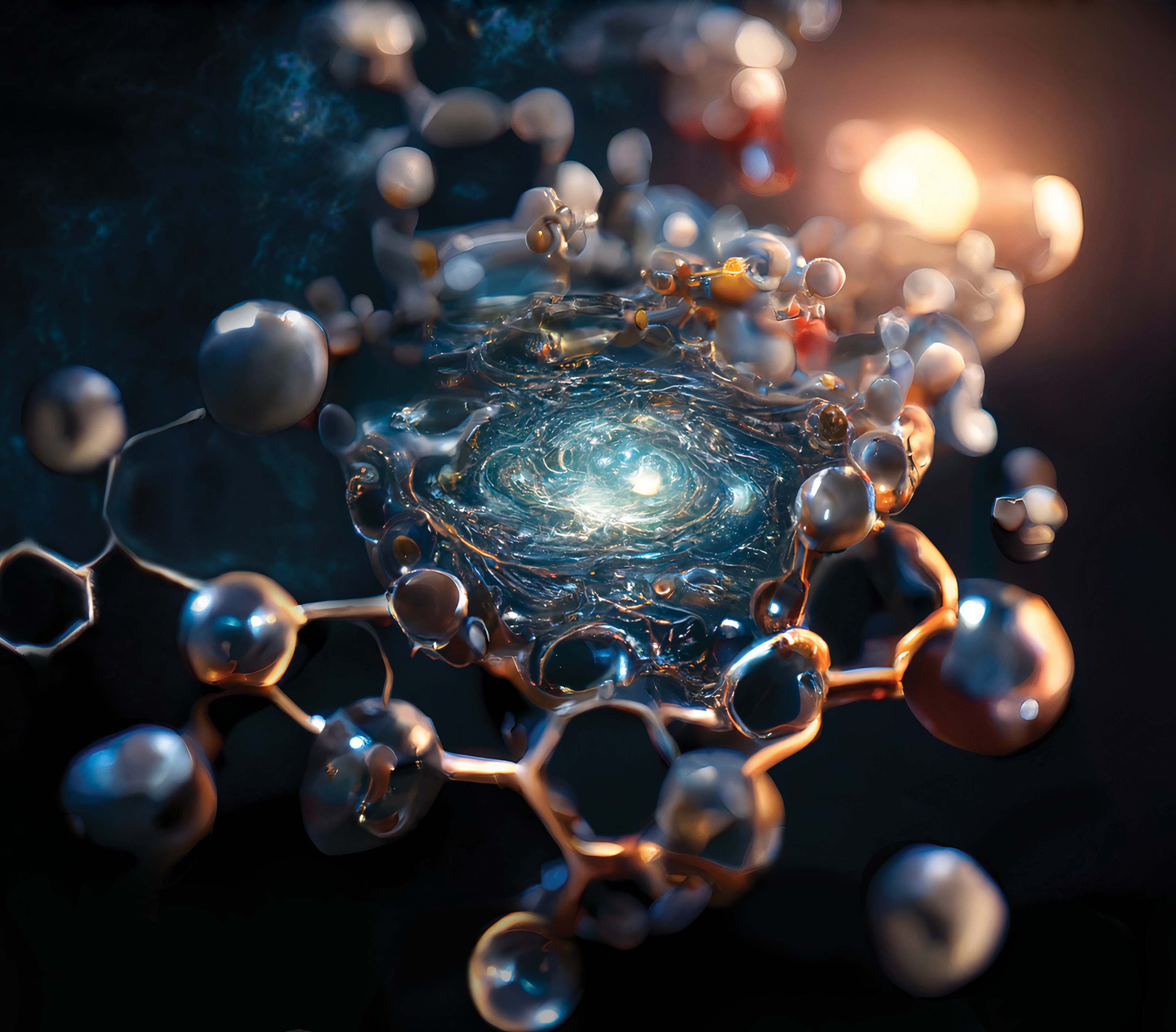
BIOLOGICAL DARK ENERGY



Mohammad Ali Taheri | Originator of T-Consciousness Theory

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Experimental Investigation of T-Consciousness Information Transfer in Water Molecules & Living Cells and Introduction to Biological Dark Energy

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Editorial

MOHAMMAD ALI TAHERI

Founder of T-Consciousness Theory

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Empirical Evidence on the Existence of Biological Dark Energy/ Taheri Information/ The Mind of Water

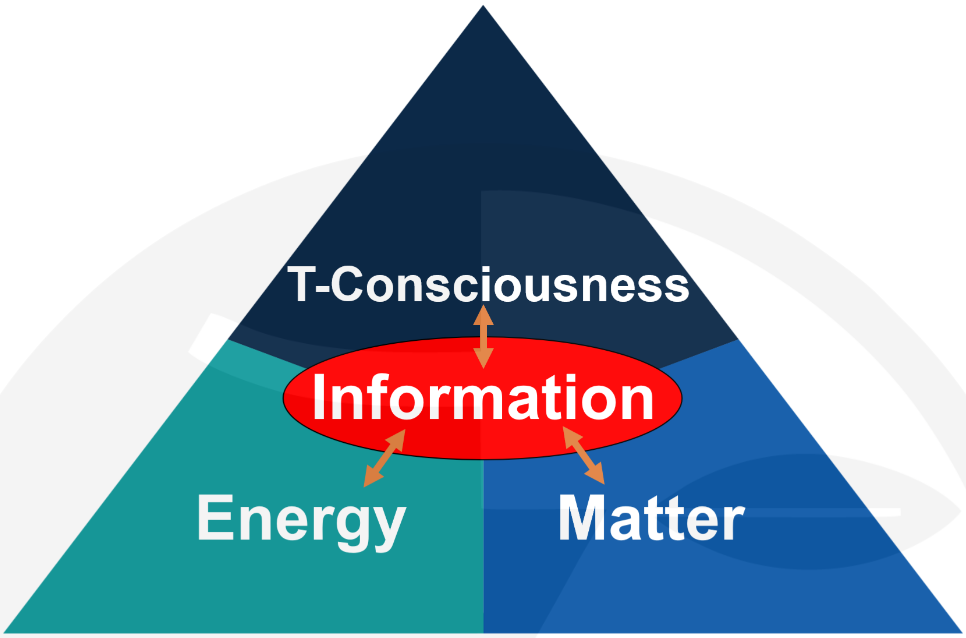
The first step, in the stages of studying T-Consciousness Fields, is to investigate the influences of these fields at the level of matter and energy. In addition to confirming the effects of the T-Consciousness Fields, the findings of the studies presented herein will be examined in accordance with this theory of Mohammad Ali Taheri (founder of the T-Consciousness Fields theory). These non-material/non-energetic fields cannot be *directly* measured by scientific instruments. However, their influence is expressed as material and energy changes in the structure of materials and the behavior of biological organisms. These changes can then be examined through various scientific experiments. Thereby, the new science of ScienceFact seeks to reveal the effects of T-Consciousness Fields through employing the scientific research method. The studies published in this issue are summarized along the following lines:

A. Experiment on water which comprises 70% of the weight of cells and living organisms. This study performed a comparison between changes in pH levels (one of the significant parameters among water molecules and atmospheric gasses, especially carbon dioxide) and changes in pure water temperature under the influence of T-Consciousness Fields with a control group under the same environmental conditions.

B. Study on the ATP production or the quanta of cellular energy exposed to the T-Consciousness Fields, with the aim of evaluating the changes in ATP levels in a short period of time. This study demonstrates the instantaneous effects of these fields on energy required for life.

C. The third paper aims to review and analyze the empirical observations in the above studies based on Taheri's theories, by discussing the possible path for the instantaneous production of Biological Dark Energy in a cell, also presenting Taheri's view of information flow and the different mind levels.

A number of significant findings have been derived from the empirical studies and scientific calculations of the articles presented in this issue. First and foremost, it is the very first mention of Biological Dark Energy, derived from the empirical observations of laboratory studies. Biological Dark Energy is an enormous amount of energy that is instantly produced for a living organism that is not derived by conventional cellular methods. Second, it has been found through thermodynamic calculations, that the processes influenced by the Taheri Consciousness Fields in empirical studies, lead to a decrease in entropy (commonly known as disorder) at the level of the system. Additionally, given the theory of information and analyzing the level of fluctuations in the aforementioned experiments, there was a confirmed increase in information in the system as a result of T-Consciousness Fields. According to Taheri's theory, in addition to matter and energy, the universe is formed of a third component named



The relationship between information, T-Consciousness, matter, and energy.

T-Consciousness, and information is the conduit for turning it into matter and energy.

In this relation, matter, energy, and T-Consciousness find a common denominator called T-Information. Consequently, this is presented as the "principle of conservation of matter, energy and information".

Investigation on the influence of T-Consciousness Fields on the living and non-living constituents of the ecosystem continues under standard laboratory experiments accepted by the scientific community. As the studies develop, the results reveal the different functional aspects of these novel Fields in the realization of the unknown potential of the universe.

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Investigation of the Influence of Taheri Consciousness Fields on the pH of Pure Water in the Vicinity of Air

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Abstract

T-Consciousness Fields (TCFs) have been introduced by Mohammad Ali Taheri and the effects of these fields on living and non-living systems have been studied in various experiments. Taheri's theory of *Mind-of-Matter* (Mental Body of Matter) has been discussed in the studies of the behavior of matter under the influence of T-Consciousness Fields. In the present study, changes in pH and temperature of pure water under the influence of three different TCFs have been investigated. Given that the environmental conditions and materials used in this study are the same for the control and the test samples, it is generally expected that all samples behave similarly in terms of pH and temperature of the solution. However, meaningful differences were observed between the behavior of the test samples and that of the control which necessitated performing thermodynamic calculations for better comparison. The results of this experiment, in addition to confirming the distinct effects of the TCFs, showed that: (1) the application of the TCFs has caused states with lower entropy to occur in the systems under the influence of TCFs; (2) The negligibly small difference between the enthalpy of the control and that of the test samples is indicative that there has been no energy transfer in the form of heat. And the energy available for sharing to the system under the influence of TCFs is considerably less than the amount required for conversion to mass. Hence, it seems that the application of TCFs and their interaction with the mind-of-matter have caused matter to transition from one mental state to another, and by assigning a new property appropriate to the new mental state, it has enabled matter to exhibit a new behavior.

Keywords: Mind of Matter; Taheri Consciousness Fields; Water pH; Entropy; Gibbs Free Energy; Enthalpy

Introduction

On the earth, life is not possible without water. In the history of the formation of the earth, the cooling of the earth's crust and the formation of water have been the main stages in the development of life. The prevailing hypothesis of the beginning of life by Oparin, 1957) and (Bernal, 1967) holds that low-molecular-weight organic components that constitute living organisms are produced abiotically and exist in low concentrations in the primordial waters of pre-life as the containing media. On the other hand, the presence of water as a reactant or product in most biological reactions emphasizes the active role of water in the formation of metabolism and favors the theory of the "metabolism first" over the "polymer formation first" (Frenkel-Pinter et al., 2021). In addition, water molecule chemistry and its significant differences in physicochemical properties have led scientists to consider it a better candidate for the formation and optimal homeostasis of life, among other fluids (Ball, 2017).

The unique properties of water, along with other capabilities, such as water memory (Fortner et al., 1988) and the effectiveness of its structure from positive energies (Emoto 2004, Radin et al., 2006), led us to study the pH of water under the influence of the T-Consciousness Fields (TCFs). According to Taheri's theory, there are various TCFs with different functions that are a subset of the Cosmic Internet Network or Cosmic Consciousness Network (CCN) and which have can an effect on all living and non-living systems, such as humans, plants, animals, microorganisms, all types of materials, substances, etc.

In the following, considering the thermodynamics of the water ionization reaction and the relationship between energy and pH, the theoretical foundations required for these studies are discussed. In this experiment, for the first time, the reaction of water ionization in the presence of T-Consciousness is investigated, and for this purpose, the pH of pure water under the influence of different TCFs is studied. Finally, calculating the thermodynamic parameters of water at constant pressure (atmospheric pressure) and in standard conditions, we study the mind of water based on Taheri Consciousness Field theory.

pH and Thermodynamics of Water

Of all the possible chemical reactions that take place in water, the most basic is water ionization, in which water ionizes spontaneously and produces hydroxide (OH^-) and hydronium (H_3O^+) ions (Stillinger 1978). The formation of a liquid state, the pH of water, and many of the basic processes in chemistry and biology that involve water are the result of this reaction (Agmon et al., 2016). Experiments show that the average lifespan of each water molecule before self-ionization is about 11 hours (Eigen and de Maeyer 1958, Natzle and Moore 1985).

Unlike the significant effect of carbon dioxide gas, the entry of neutral gases (H_2, O_2, N_2, He, Ar, CH_4, CO) into pure water (pH = 7), leads to a maximum pH change of only ± 0.06. However, when water is impure and saturated with these gases, its pH tends to reach somewhere between 7.5-8 (alkaline medium) (Fricke et al., 1973). Changes in thermodynamic parameters and energy flow (free energy and heat) as a result of exposure of water to carbon dioxide indicate a relationship between pH or water ionization and energy, the details of which are given in Appendix 1.

The Law of Conservation of Mass and Energy

According to Einstein's theory of special relativity, mass and energy can be converted into each other. Therefore, the amount of material mass that exists in the Cosmos cannot be considered constant, but by applying the theory of relativity to the principle of conservation of mass and the principle of conservation of energy, a more general law can be concluded according to which the total mass and energy in the Cosmos is always constant. According to this theory, energy and mass can be converted to one another and are expressed by the following relation:

$$1)\ E = mc^2$$

Where E is energy, m is mass, and c is the speed of light in the vacuum. Among the phenomena in which mass is converted into energy, we can refer to the phenomena of fission and fusion of the nucleus and the destruction of the pair. Conversely, energy converts to mass in interactions, such as pairwise generation, gamma-gamma interaction, and collision of energetic particles. In all these phenomena, the principles of electric charge conservation, baryon number, total relativistic energy, and momentum transfer must be preserved.

Taheri Consciousness Fields

In the present century, the nature of consciousness and its place in the world of science has received much attention. Many philosophical and scientific theories have been presented in this field. In the 1980s, for the first time, Mohammad Ali Taheri proposed T-Consciousness Fields in which he introduced the novel fields that are non-material and non-energetic called Taheri Consciousness Fields (TCFs). In this theory, T-Consciousness is one of the three constituent elements of the universe apart from matter and energy. According to this theory, the mental body of matter includes information on each component of the system, the process of formation and all its equilibrium and unbalanced states, and mental states that were formed during the process of formation of matter and its equilibrium state. The function of the mental body of matter is to maintain the information, to interact with the CFs, to accept new mental states, and to exhibit behavior appropriate to the new mental state.

According to this theory, there are various TCFs with different functions, that are the subcategories of a network of universal internet called the Cosmic Consciousness Network (CCN). The major difference between the theory of TCFs and other theoretical concepts about consciousness is related to the practical application of TCFs. TCFs can be applied to all living and non-living systems, including humans, plants, animals, microorganisms, hard and soft materials, all types of substances, etc.

Figure 1 depicts a schematic image of the Connection to T-Consciousness Fields. The influence of the TCFs begins with the connection between CCN as the Whole Consciousness of the universe and the subjects under study. This connection, called “Ettesal”, is established by Faradarmangar's mind (a certified and trained individual who has been entrusted with the TCFs). The human mind (the Announcer) has an intermediary role that initiates the Ettesal by imparting a swift and brief attention to the object under study. The observed effect is, therefore, solely the result of the TCFs affecting the system. These fields cannot be directly measured by scientific means, but it is possible to investigate their effects on various subjects through reproducible laboratory experiments (Taheri 2013).

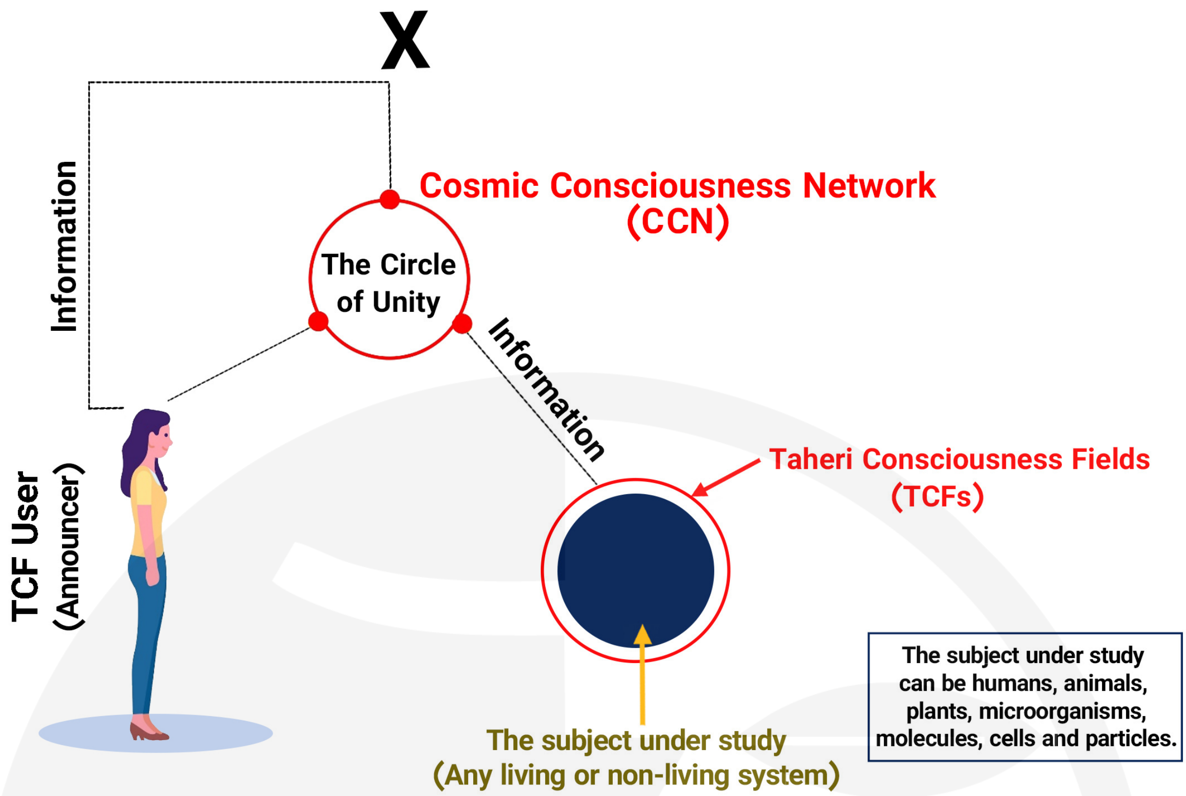


Figure 1. Schematic Image of Connection to the T-Consciousness Fields.

Mohammad Ali Taheri the founder of Erfan Keyhani Halqheh school of thought, introduced a new science in 2020 as a branch of this school. He coined the term Sciencefact for this new science because it utilizes scientific methods to prove the existence of T-Consciousness as an irrefutable phenomenon and a fact. Science focuses solely on the study of matter and energy, Sciencefact, by contrast, explores the effects of the non-material/non-energeticTCFs. Sciencefact has provided a common ground between the world of matter/energy and the non-matte/non-energy by facilitating the conduction of reproducible laboratory experiments in various fields of science, and has used the scientific approach in proving the existence of the T-Consciousness Fields.

Materials and Methods

Test method

In this experiment, twelve samples of double distilled water were prepared, and then, the pH and temperature of the samples were measured and recorded. Of these samples, three were marked as the control samples and were not subjected to any treatment by TCFs. Of the other samples, three sets of triplets are subjected to three different TCFs: TCF1, TCF2, and TCF3. The application of TCFs to the samples was only in the first 1.5 hours of the study during which the temperature and pH of all samples were measured every half hour and then every 24 hours for three days. All the test samples and controls were kept in the same laboratory under the same conditions of temperature and pressure.

The TCFs were applied to the samples according to the protocols regulated by the COSMOintel research center (www.COSMOintel.com). A request for connection to CCN to utilize TCFs can be placed through the COSMOintel website in the "Assign Announcement" section. This complimentary access is available for all researchers worldwide. To study and experience this connection, the researchers can register on the website above at any time and report the experiment to the COSMOintel research center. It is necessary to provide the center with the design and details of the experiments; for example, the number and the type of cases need to be specified.

Materials and Equipment

The following material and equipment were used in this experiment:

- Pure water: Double distilled water is used in this study. PET containers with a volume of 250 cc were used, and the volume of water samples was 200 ±10 cc.

- InoLab PH Level 2 pH meter made by WTW company was used in this study (Figure 2). This device automatically compensates its value for temperature.

Figure 2. InoLab Level 2 pH meter (photo courtesy of www.labstuff.eu)

Accuracy, Resolution, and Precision

- The *accuracy* of the equipment used in this study depends on its calibration. Considering the credibility of the laboratory and the establishment of the ISO 17025 standard in it, one can be certain of the proper calibration of the device and the required accuracy in its precision range.

- The pH and temperature measurement precision of the devices are ± 0.005 and ± 0.1 degrees Celsius, respectively.

Statistical analysis

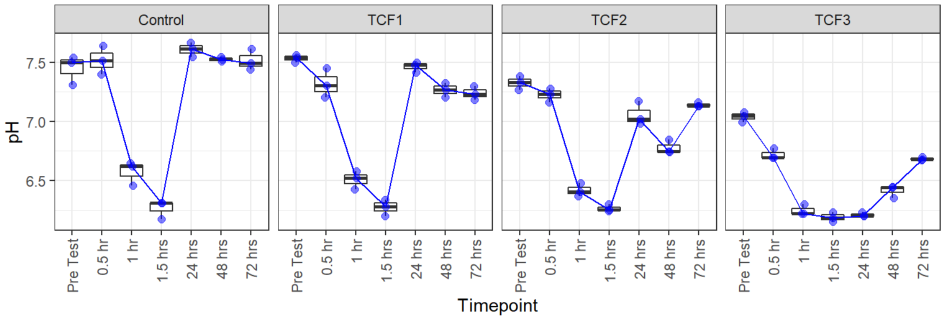
Data were analyzed using GraphPad Prism software version six. The values were expressed as mean ± standard error and analyzes were repeated at least three times. Then two-way variance analysis followed by multiple comparisons with 95% confidence intervals was performed and significant values less than 0.05 ($p < 0.05$) are presented.

Results

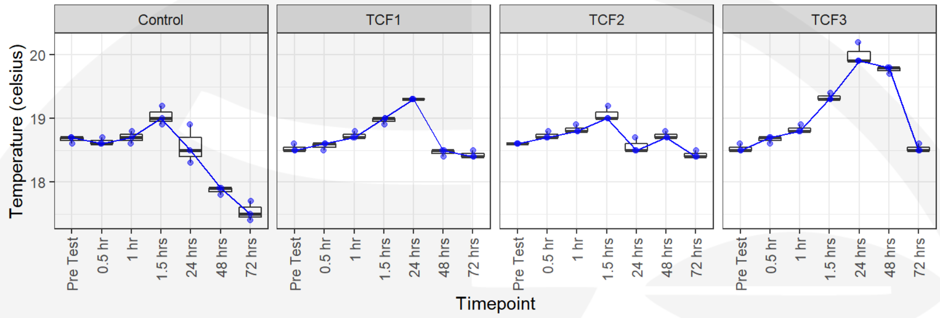
pH Comparison Between Test Samples and Control

The measured average pH and temperature of each batch of samples are shown in Figures 3a and 3b. The comparison of the test and the control samples over 72 hours of the experiment is plotted in Figure 3c. As can be seen in Figure 3c, all samples reached approximately the same value after 1.5 hours, but after that, the pH of each batch of samples reaches a different value than the rest. The control reached a higher pH level than the test samples and the samples under the influence of TCF1, TCF2, and TCF3 reached lower pH levels, respectively.

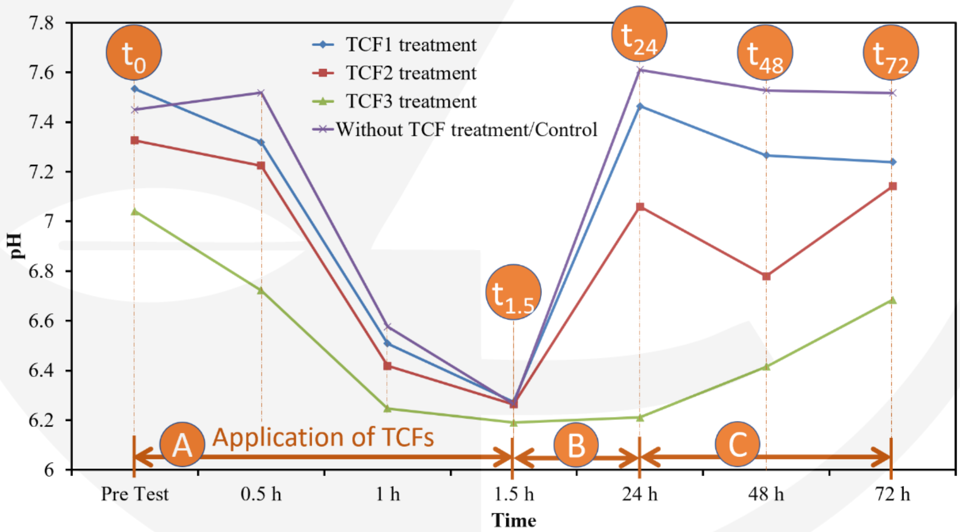
In addition, it can be seen that even after about 72 hours of TCFs treatment, their effect still remains. Comparison of pH values in the final three measurements, after the application of the three TCFs was completed (after the studied system reaches an equilibrium with the environment), indicates the difference in the susceptibility of the three samples (to TCFs) and their tendency to reach the pH values shown in Table 1.



(a)



(b)



(c)

Figure 3. (a) Average pH and (b) temperature of the test samples and control at different measurement times separately with the standard deviation; (c) comparison of average pH of test and control samples and distinct zones.

Three distinct zones can be observed in Figure 3c. The behavior of the test and control samples in all three zones are discussed in detail in the discussion session. Brief explanations of the behavior of the test and control samples in zones A, B, and C, are provided below:

Zone A (from t_0 to $t_{1.5}$) is the duration of the exposure of the test samples t_o the TCFs. In this zone, the pH of the test and control samples decreases due to the dissolution of carbon dioxide from the air in the water, until they reach the minimum values at $t_{1.5}$. No distinct effect of TCFs on the test samples can be observed in this zone. Therefore, the effect of TCFs on the test samples is not considered in this zone.

Zone B (from $t_{1.5}$ to t_{24}) is the duration in which the dissolution of carbon dioxide in the water stabilizes. A major effect of TCFs on the test samples can be observed in this zone. The analysis of the effect of TCFs on the test samples starts from the beginning of this zone, where all the test and control samples have almost the same initial conditions (time $t_{1.5}$).

Zone C (from t_{24} to t_{72}) is the duration in which the dissolution of carbon dioxide in the water is stabilized in the control samples but not in the test samples. A significant effect of TCFs on the test samples can be observed in this zone which has also been included in the detailed analysis of the effect of TCFs on the test samples.

The result of the analysis of the significant pH differences between each group of samples compared to control samples based on the ANOVA method is shown in Figure 4. The differences between the test samples and the control for the last three time intervals of the study are significant and should be considered, except for the results of the pH of the samples under the influence of TCF1 at the 24th hour. The pH values of the samples under the influence of TCF1, TCF2, and TCF3 at the 72nd hour were 4%, 5%, and 11% lower than the control, respectively.

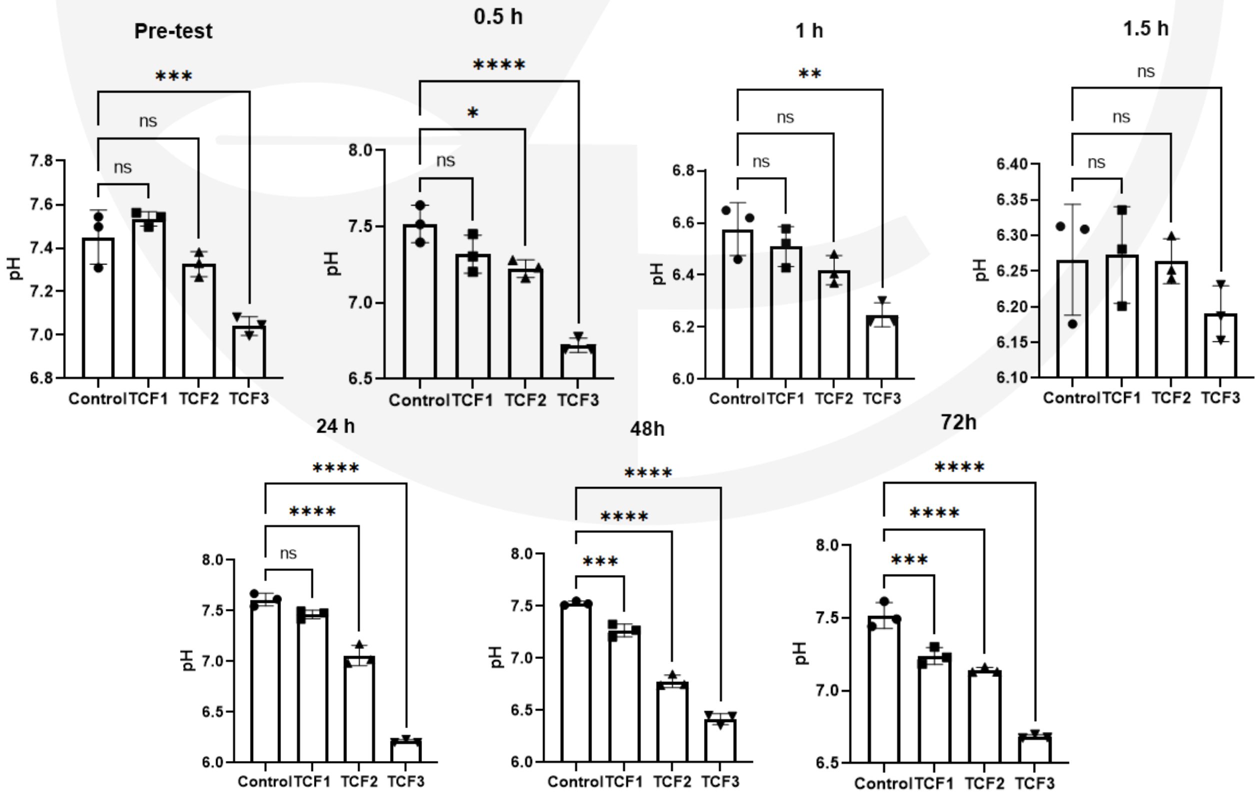


Figure 4. pH of each group of test samples at the different measuring times compared to control samples based on the ANOVA method.

The comparison between the mean, as well as all the data related to the pH values in the samples in the last three time intervals of the study (after the completion of the TCFs treatment), are given in Table 1 and Figure 5, respectively. The observed difference between the pH of all samples under the influence of TCFs is meaningful when comparing the pH of each group of samples and analyzing their significance in relation to each other and to the control.

Table 1- Mean pH values in the last three measurements of the study after completion of the treatment of TCFs - significant differences in comparison to the control are marked with * (p-value <0.05) and *** (p-value <0.001).

Sample	Averaged pH of the last three measurements
Control	7.55±0.04
TCF1	7.32±0.10
TCF2	6.99*±0.16
TCF3	6.44***±0.19

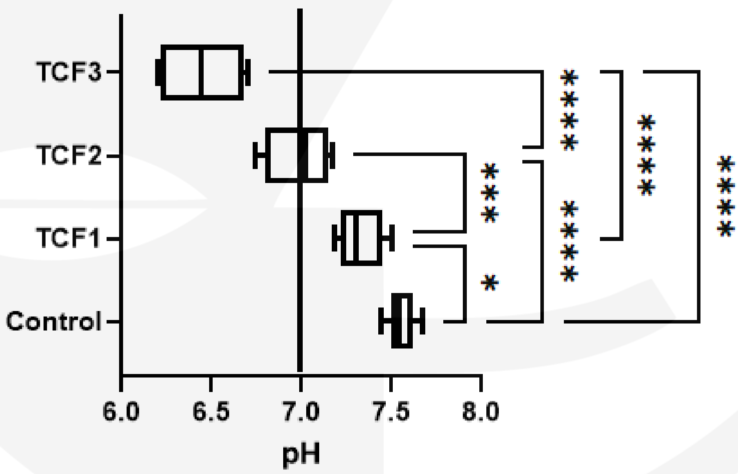


Figure 5. Representation of all data for measurements of the last three time intervals (24, 48 and 72 hours), including mean display per box and the the analysis of the significance of the values relative to each other and to the control by one-way ANOVA method *:p-value<0.05; **: p-value<0.01; ***:p-value<0.005; ****:p-value<0.001.

Temperature Measured in the Control and Test Samples

Since the temperature of the samples and the control were also recorded at the time of pH measurement, the average temperature of the last three measurements (after the completion of the TCFs treatment) for each batch of samples is shown in Table 2 and Figure 6.

Table 2 – Mean values of temperature in the last three measurements of the study

Sample	Three last Temp. measurements/°C
Control	17.99±0.43
TCF1	18.73±0.40
TCF2	18.58±0.12
TCF3	19.43±0.64

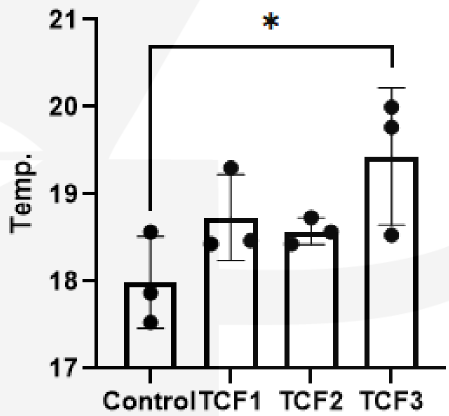


Figure 6. Representation of all data for measurements of the last three time intervals (24, 48 and 72 hours), including mean display per box and the analysis of the significance of the values relative to the control by one-way ANOVA method. Significant differences with the control are marked with * (p-value <0.05).

Calculation and Comparison of Thermodynamic Parameters

The values of thermodynamic parameters of the samples under the influence of TCFs and the control in the last three measurements of this study are compared in Table 3 and Figure 7.

Table 3. Comparison of the mean values of the thermodynamic parameters of the system (Enthalpy Changes (ΔH), Gibbs Free Energy (ΔG) and the entropy changes (ΔS)) calculated in the last three measurement times of this study.

	ΔG			ΔH			ΔS		
	Calculated (kJ/mol)	Difference with Control (kJ/.mol)	%Difference with Control	Calculat ed (kJ/mol)	Difference with Control (kJ/mol)	% Difference with Control (kJ/mol)	Calculated (kJ/K.mol)	Difference with Control (kJ/K.mol)	%Difference with Control
Control	-36.26	-	-	15.64	-	-	0.18	-	-
TCF1	-33.02	3.24	-8.94	15.66	0.02	0.14	0.17	-0.01	-6.45
TCF2	-27.6	8.66	-23.87	15.65	0.02	0.11	0.15*	-0.03	-16.81
TCF3	-19.79	16.47	-45.42	15.68	0.04	0.27	0.12	-0.06	-31.98

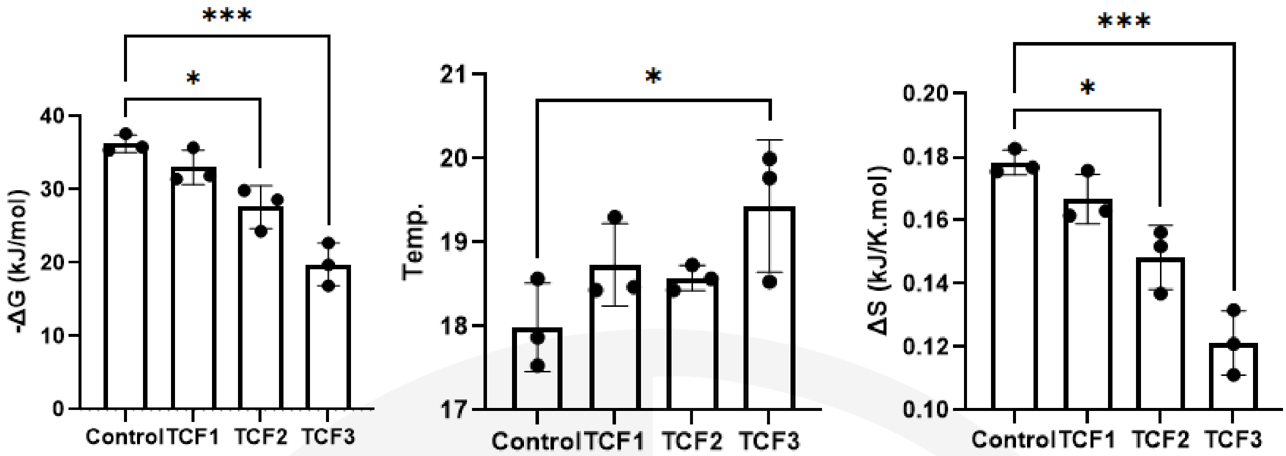


Figure 7. Comparison of the mean and all values of the thermodynamic parameters of the system calculated in the last three measurement times of this study including mean display per box and the analysis of the significance of the values relative to the control by one-way ANOVA method. Significant differences with the control are marked with *: p-value <0.05 and ***: p-value <0.005.

Details on the changes in entropy, Gibbs free energy, and enthalpy are provided below.

Entropy Changes

The entropy changes of the system (ΔS) in the average of the last three measurements of the study are shown in Table 3. The total entropy changes for different sample sets are shown in Figure 8. It can be observed that the total entropy after 1.5 hours is highest in the control. Samples under the influence of TCF1, TCF2 and TCF3 are at lower entropy levels, compared to the control. A comparison of system entropy in Table 3 demonstrates a decrease in system entropy in the samples under the influence of TCFs compared to the control. *Therefore, the application of TCFs made it possible for lower entropy states to occur.* The occurrence of states with lower entropy requires less energy to be distributed or shared, which is practically contrary to the natural selection of spontaneous processes.

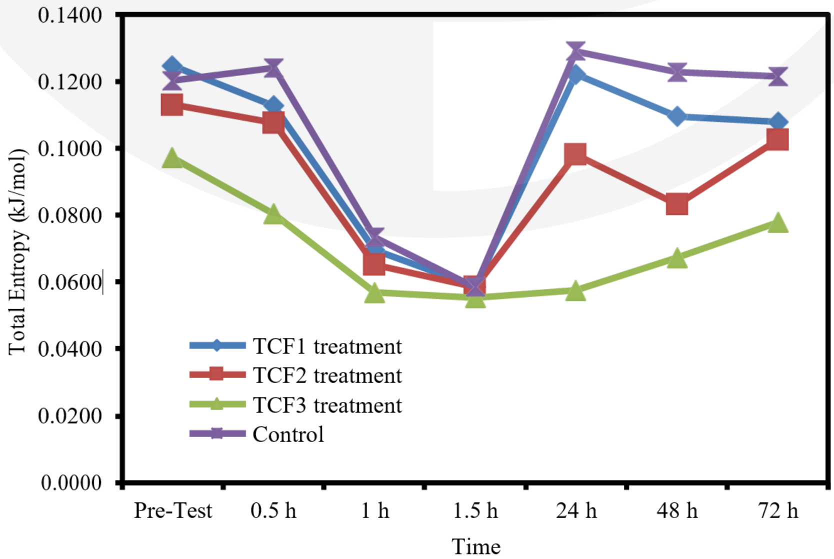


Figure 8. Total entropy (sum of system and environment) for the different sample sets.

Changes in Gibbs Free Energy

The average values of distributable or shared energy (Gibbs Free Energy, ΔG) for the last three measurements of the study are shown in Figure 9 and Table 3. Table 3 details that the application of TCF1, TCF2 and TCF3 reduces the values of distributable or shareable energy of the system compared to the control samples by about 9%, 24%, and 45%, respectively.

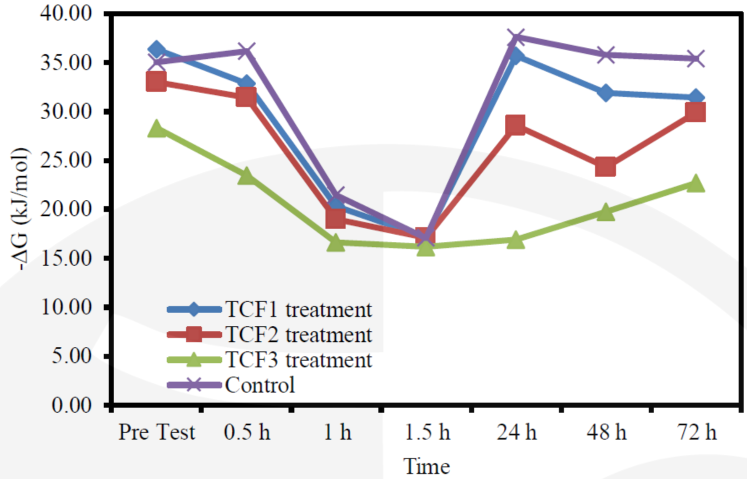


Figure 9. Amount of distributable or shareable energy (Gibbs free energy) of the system in the sample and control of this study.

Enthalpy Changes

Table 3 shows that the lowest amount of energy that is unavailable for distribution is 3.24 kJ/mol for TCF1 treatment. And the maximum difference between the enthalpy of the control and the samples under the influence of TCFs (ΔH) is 0.04 kJ/mol, which is much less than 3.24 kJ/mol. Therefore, the amount of energy difference (calculated in the previous section) has not appeared as heat.

Figure 10 shows the enthalpy values measured at different time intervals. It is plotted to check whether the energy available for distribution or sharing by the system (calculated in the previous section) has existed in the environment in the form of heat.

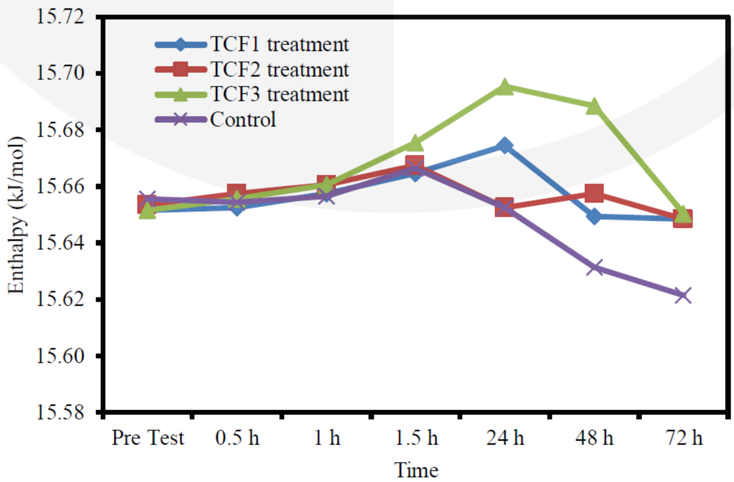


Figure 10. Enthalpy of samples and control at different measurement time intervals of this study.

Changes in Gibbs Free Energy in Various Micro-Reactions Affecting the Water pH

Figure 11 shows the contribution of each of the possible reactions in water that in some way affect its pH and Gibbs free energy. It is observed that the reaction of water ionization and dissolution of carbon dioxide in water has the largest share in regulating the Gibbs free energy in the new state compared to the state of control. Table 4 shows the contribution of each reaction in setting up the new state compared to the state of control. The data in Table 4 demonstrate that the pH of the samples under the TCFs treatment are often adjusted by changes in the rate of water ionization and also the rate of dissolution of carbon dioxide. Thus, in the application of TCFs, more carbon dioxide gas is dissolved in water compared to the control. However, its energy is not used for facilitating the bicarbonate production reaction, but rather it is used for water ionization and increasing H^+ concentration, thus lowering the pH.

Table 4. The contribution of each of the reactions in setting up the new state compared to the state of control.

Sample	Gibbs Energy (kJ/mol)				Share of each reaction to control (%)			
	Total	Water ionization	Dissolved CO^2	Bicarbonate production	Total	Water ionization	Dissolved CO^2	Bicarbonate production
Control	-36.26	-4.28	-33.45	1.47	-	-	-	-
TCF1	-33.02	-1.93	-32.64	1.55	8.94	72.35	25.18	2.47
TCF2	-27.60	1.81	-30.77	1.36	23.87	70.27	31.04	-1.31
TCF3	-19.79	7.82	-28.58	0.96	45.42	73.47	29.61	-3.08

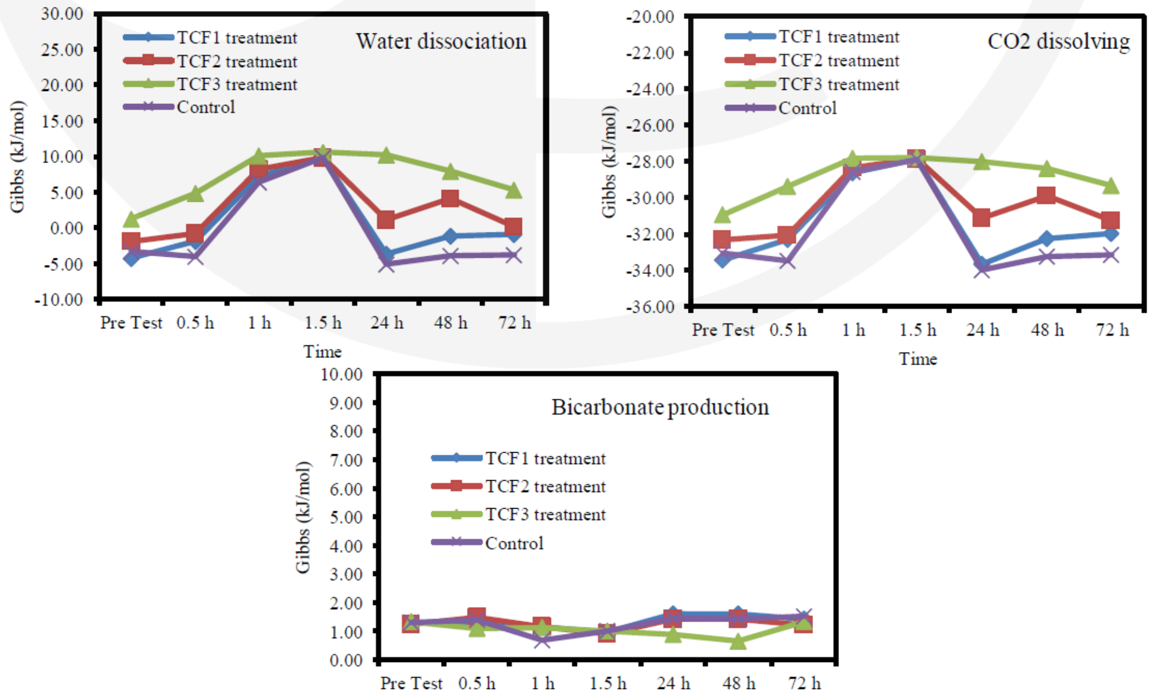


Figure 11. Contribution of each of the reactions affecting pH of water and Gibbs free energy.

Discussion and Conclusion

It has been reported by other researchers that the magnetic field has a pH-increasing effect on water (Gonet, 1985). As the ionization of water changes under the electromagnetic field, an increase in hydroxide ions and the adsorption of hydrogen ions occur (Mghaiouini et al., 2020). However, the pH of double distilled water (pH = 7) under the influence of magnetic fields with magnetic flux density in the range of 0 to 24000 Gauss has been reported unchanged (Quickenden et al., 1971). In another study, a change of approximately +0.62 in the pH was reported in the range of 1900-5700 Gauss (Joshi and Kamat, 1966).

As reported in previous studies by the authors, TCFs' influence on the materials is distinct from all physical fields, such as the magnetic field (Taheri et al., 2021). In this experiment, the distinctive effect of the TCFs on the properties of water is demonstrated. The results of the pH measurements show that the TCF types 1, 2 and 3 utilized in this study can affect the composition of water, and that their effects are different from one another. All three TCFs reduced the samples' pH compared with the control. Furthermore, the effects of the fields are maintained up to 72 hours after the application of TCFs. The behaviors of the test and control samples in all three zones shown in Figure 3c are discussed in detail below.

The pH of pure water is a function of different environmental parameters such as temperature (T), pressure (P), and atmospheric carbon dioxide (CO_2). Based on the assumptions of this study, the TCFs are other factors influencing the pH of pure water. Therefore , we can consider pH as a function of these parameters as shown below:

$$2)\ pH = f(T, P, Co_2, \ldots, TCFs)$$

In a standard laboratory environment, the environmental parameters (temperature, pressure, etc.) can be considered to be approximately equal for the test and control samples. However, the three types of TCFs are considered as different parameters for the samples and the control. Nevertheless, as was earlier discussed, one of the assumptions about the effect of TCFs on the pH is their effect on the rate of dissolution of carbon dioxide in water samples. In other words, the TCFs may change at least one of the environmental parameters affecting the water pH differently in the samples and in the control.

The first pH measurement at the pretest time (marked by t_0 in Figure 3c) shows a 10% difference between the test and control samples. Before the first pH measurement, the lids of the containers of the double distilled water samples were removed, and the water samples were immediately exposed to the ari in the laboratory environment, and consequently, the dissolution of carbon dioxide in the water samples started. To minimize human and measurement errors, one pH measurement system and only one lab technician were involved in this study. Therefore, there were different time delays in reading the measured pH by the one technician, and consequently, the dissolution of carbon dioxide in the water samples was different. This resulted in a 10% difference between the test and control samples.

The change in the pH of pure water exposed to air is a normal phenomenon of water molecules. Based on the reports of other researchers (Haghi et al., 2017), the pH of pure water gets to its minimum value approximately two hours after it is first exposed to the carbon dioxide in the air, and the dissolution of carbon dioxide in the water stabilizes in under 10 hours.

In this study, the change in the pH of water has been investigated under the influence of TCFs. Due to the exposure of both test and control samples to the carbon dioxide in the air, the changes in the water pH are observed in both the test and control samples throughout the test. The application of TCFs to the samples was only in the first 1.5 hours of the study. The measurements of the water pH show that after 1.5 hours from the start of the experiment, the test and control samples reach the minimum value (marked by $t_{1.5}$ in Figure 3c). The last three measurements of the pH are done after 24, 48, and 72 hours to ensure the stability of the dissolution of carbon dioxide in the water. Comparing the behavior of the test and control samples at 24, 48, and 72 hours, marked by t_{24}, t_{48}, and t_{72}, respectively in Figure 3c, the effect of TCFs on the test samples can be observed and confirmed.

The calculation of thermodynamic parameters shows that all three types of TCFs reduced the total entropy. In other words, they reduced the system's accessibility to distributable or shared energy. However, the amount of reduction caused by each of three TCFs is different; TCF3 and TCF1 resulted in the maximum and minimum reduction, respectively. The maximum difference between the enthalpies of the control and the samples under the influence of TCFs was 0.04 kJ/mol, which is far less than the amount of energy that is unavailable to the system for distribution (3.24 kJ/mol for TCF1 which is the lowest value among the samples). And therefore, this amount of energy difference had not appeared as heat. According to the currently proposed model for materials, all materials have some level of mental body (Taheri et al., 2022). Therefore, the amount of energy unavailable for exchange or sharing can be attributed to the mind-of-matter. In other words, the application of TCFs on matter and their interactions with the mind of matter have caused a new behavior to emerge in matter, which here exhibits as the system having less energy available for sharing or exchange compared to the control.

Examination of Gibbs free energy changes in various reactions affecting the pH of the water and calculating the contribution of each reaction in altering the state of samples under the influence of TCFs compared to the state of the control shows that in applying TCFs, more carbon monoxide gas is dissolved in water compared to control. However, its energy is not used to aid the bicarbonate production reaction, but rather, it is used for water ionization and increasing the H^+ concentration, thereby, reducing the pH of the water. It should be noted that the rate of dissolution of carbon dioxide in samples affected by different TCFs is different and this value is the highest for TCF3 and the lowest for TCF1. In this study, water, in its molecular form as an environment, played the most important role in regulating the structure of samples influenced by TCFs.

On the one hand, it has dissolved more carbon dioxide gas, and on the other hand, it has favored the ionization process over the bicarbonate production reaction. Since this requires the samples under the influence of TCFs reach to lower entropy state, in comparison with the base state (control), this cannot be justified without considering some form of mental body for water; because, there is neither a material nor an energy factor that could be caused the selection of a path in which less energy is distributed or shared (Figure 11), a path contrary to that of the nature's tendency.

As mentioned, in this study, some of the total energy of the samples under the influence of TCFs was out of reach for sharing or distribution, and it was found that this energy did not appear as heat. In such a situation, one may assume that this energy has converted to matter/mass. However, if energy is converted to matter, as the mass increases, so does the number of microstates in which energy can be distributed, so the total entropy must increase; while the data from this study indicate that the total entropy has decreased. On the other hand, it should be noted that the amount of energy that is unavailable for sharing or distribution, according to Table 2, reaches a maximum of 16.5 kJ/mol in samples under the influence of TCF3.

In other words, each particle loses about 2.7×10^{-20} J or 0.17 eV energy (1 eV = 1.6×10^{-19} J).

The energy equivalent to the mass of the smallest known particle in the world, the electron neutrino, is estimated to be about 2.2 eV. Therefore, according to conservation laws, it can be stated that the amount of energy out of reach is much less than what is needed for production of such particles and thus this energy could not have been converted into mass.

"Thus, given that energy has not been transformed into another form (heat) or mass, there is a question as to where the shared energy or dissipated energy has gone."

To answer this question, we either have to consider the system to be open, which is improbable considering the control; or we must accept the effect of the TCFs as the agent that introduces a third component into the system and thus opening it up, which requires the assumption that there is a third component that plays a role here between matter and energy. According to Taheri's theory of TCFs, this third component is *information*. As it has been mentioned previously by the authors of the present study (Taheri et al., 2022), the announcer mediates the exchange of *information* with the mind of matter through the TCFs and by altering the mental state of matter as a result of this exchange of information, it changes the energy level of matter and, consequently, changes the behavior/properties of matter. Following this research, an article in concerning this energy and related details will be published by the authors. The observations of this study can be concluded as follows:

1- TCF types 1, 2, and 3 influence the pH of the water to varying degrees as their effects were different from one another.

2- All three types of TCFs reduce the total entropy, or in other words, they reduce the system's accessibility to distributable or shared energy.

3- Due to the fact that the amount of energy reduced under the influence of the TCFs does not appear as heat and that the occurrence of behaviors, such as increased dissolution of carbon dioxide, higher ionization of water instead of bicarbonate production, and the reduction of entropy is not possible without an intervening of a material and/or energetic factor, the existence of a mental body in matter according to Taheri's theory is therefore confirmed.

4- The observation that the energy loss is not converted to heat and is less than the amount required for conversion to mass warrants further research and investigation.

For future work, the authors plan to use robotic systems for the water pH measurement to decrease human error and various delays in the measurements of the test and control samples. Also, several gas sensors, including carbon dioxide sensors, will be used inside the water sample containers in order to obtain more accurate measurements of the effects of TCFs and higher precision of statistical analysis.

Conflict of Interest

The authors report no conflict of interest.

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Appendix: Theoretical Foundations Related to the Concept of pH and Thermodynamics of Water

In the chemistry literature, the term pH is used to describe the acidity or alkalinity of a liquid solution. The term is also widely used in biology and agriculture. The word pH means "hydrogen ion potential". The concept was introduced in 1909 by the biochemist Soren Sorensen. According to him, the pH of a solution is a measure of the concentration of hydrogen ions in it; in other words, it is equal to the negative logarithm of the concentration of hydrogen ions. If we write this definition for the concentration of hydronium ions, we will have:

$$1)\ pH = -Log([H^+])$$

In 1924, Sorensen discovered that the pH of a solution was a function of the "activity" of the H+ ion and had nothing to do with concentration. Thus, he proposed a newer definition of pH. According to this definition, the pH of a solution is obtained from the following equation:

$$2)\ pH = -Log(a[H^+])$$

In this regard, a[H+] emphasizes the activity (effective concentration) of hydronium ions. The activity of an ion is a function of many variables, one of which is concentration.

Due to the difficulty of accurately measuring H+ activity in most solutions, the International Union of Pure and Applied Chemistry (IUPAC) and the National Bureau of Standards (NBS) define pH as read in pH meters standardized against buffer solutions. The most accurate way to measure the pH of a water sample is the potentiometric method. The potentiometric method is based on the Nernst equation, which defines the relationship between the potential of an electrode pair and the activity of a hydrogen ion:

$$3)\ E = E0-(2.303\ RT/nF) \times \log(a[H^+])$$

Where E is the total potential between the two electrodes (mV) and E0 is the standard potential depending on the temperature of the electrode. R is the general constant of gases ($Jmol^{-1}K^{-1}$), T is the absolute temperature (K), n is the ion capacity (charge) (n=1 for hydrogen ions), F is the Faraday constant ($Cmol^{-1}$) and $a[H^+]$ ion activity of hydrogen.

pH of Pure Water

Water is not always in the form of H_2O molecules, but water molecules react with each other to produce hydronium (H+), and hydroxide (OH-) ions:

$$4)\ H_2O \leftrightarrow H^+ + OH^-$$

This phenomenon is called spontaneous ionization of water. The concentrations of hydronium ions and hydroxide ions in pure water are equal. The molarity of hydronium ions and hydroxide ions at 25 °C are both 10-7. As a result, an equilibrium constant can be considered for the ionization of water. This equilibrium constant is obtained from the following relations:

5) $K_w = [H^+] \times [OH^-]$

6) $(-\log 10\ [H^+]) + (-\log_{10} [OH^-]) = -\log_{10} K_w$

7) $pH + pOH = pK_w$

The high numerical value varies with temperature so that the pH of pure water at zero and sixty degrees Celsius is 7.5 and 6.5, respectively.

Effect of carbon dioxide on water pH

One of the main sources of water acidification is carbon dioxide from air. Atmosphere contains an average of 0.032% of carbon dioxide, which is enough to reduce the pH of water. In the presence of CO_2, on the one hand, dissolved CO_2 is converted to carbonic acid, and on the other hand, it is exchanged with gaseous CO_2:

8) $CO_2\ (g) + H_2O \leftrightarrow CO_2\ (aq) + H_2O$

9) $CO_2\ (aq) + H_2O \leftrightarrow H_2CO_3$

Where g and aq refer to the gaseous and dissolved phases, respectively. Although the concentration of CO_2 (aq) is much higher than the concentration of H_2CO_3 (of the order of 10^3 times), here, the concentration of all CO_2 dissolved with $[H_2CO_3]$ is displayed. According to Henry's law, the equilibrium between the gaseous and dissolved phases is shown by the molar solubility of K_0:

10) $$K_0 = \frac{H_2CO_3}{P_{CO2}}$$

Where P_{CO2} is the partial atmospheric pressure of CO2, in atm, K_0 solubility in mol/L.atm and concentration of dissolved CO_2, [H2CO3] + [CO2 (aq)], in mol/L. The average concentration of CO2 is 387 ppm. In other words, the average partial pressure of carbon dioxide gas is equal to 387 x 10^{-6} atm. Therefore, the value of [H2CO3] is:

11) $[H_2CO_3] = [CO_2\ (g)] = PCO_2 \times Ko$

H2CO3 is decomposed in water according to the following equations:

12) $H_2CO_3 \leftrightarrow H + + HCO_{3-}$

13) $HCO_{3-} \leftrightarrow H + + CO_{3-2}$

Where the equilibrium constant or acidity constant in pure water is equal to:

$$14)\ K_1 = \frac{[H^+][H_{CO3}^-]}{[H_2CO_3]}$$

$$15)\ K_2 = \frac{[H^+][CO_3^{2-}]}{[HCO_3^-]}$$

Total dissolved inorganic carbon (DIC) concentration is defined as follows:

$$16)\ CT = [CO_2\ (aq)] + [H_2CO_3] + [HCO_{3-}] + [CO_{32-}] = a + b + c$$

$$17)\ a = [H_2CO_3] + [CO_2\ (aq)]$$

$$18)\ b = [HCO_{3-}]$$

$$19)\ c = [CO_3^{-2}]$$

The total concentration of dissolved inorganic carbon can be rewritten in terms of separation constants and concentrations of carbon components as follows:

$$20)\ C_T = \left(\frac{[H^+]}{K_1} + 1 + \frac{K^2}{[H^+]}\right)[HCO_3^-]$$

Therefore, the concentration of carbon components in water can be obtained based on the concentration of total dissolved inorganic carbon:

$$21)\ [HCO_3^-] = \frac{[H^+]K_1}{[H^+]^2 + [H^+]K_1 + K_1.K_2} \times C_T$$

$$22)\ [H_2CO_3] = [CO_2(aq)] = \frac{[H^+]^2}{[H^+]^2 + [H^+]K_1 + K_1.K_2} \times C_T$$

$$23)\ [CO_3^{-2}] = \frac{K_1.K_2}{[H^+]^2 + [H^+]K_1 + K_1.K_2} \times C_T$$

The relative contribution of $[H_2CO_3]$, $[HCO_3$-] and $[CO_3^{2-}]$ to the total carbon content in terms of pH of pure water is shown in Figure 2.

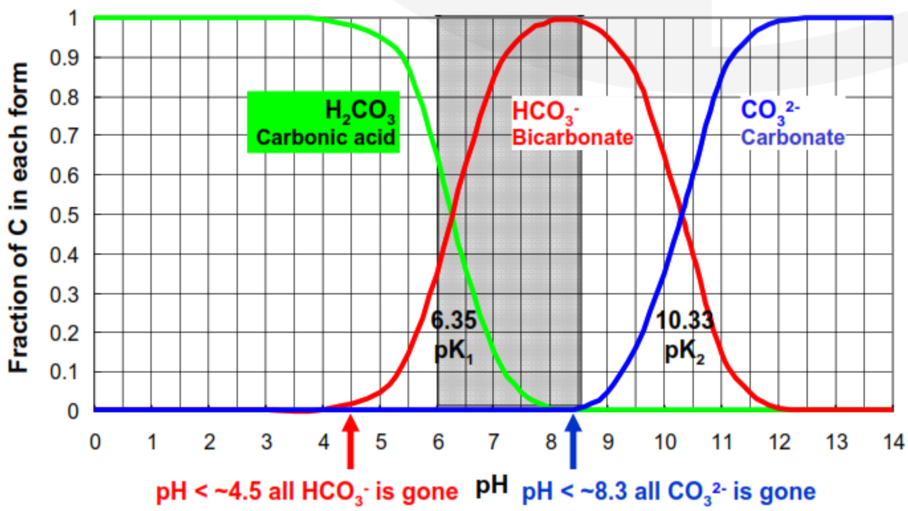

Figure 5. Relative contribution of $[H_2CO_3]$, $[HCO_3$-] and $[CO_3^{2-}]$ to the total carbon content in terms of pure water pH

Separation constants are functions of temperature. Since pure water can often be considered as an ideal solution, the relationship between its dissociation constants at 0% salinity is as follows:

24) pK_0=-2622.38/T-0.0178471T+15.5873 (Harned and Davis, 1943)

25) pK_1= 3404.71/T+0.032786T-14.8435 (Harned and Davis, 1943)

26) pK_2= 2902.39/T+0.02379T-6.4980 (Harned and Scholes, 1941)

27) $\ln K_w$ = 148.9802-13847.26/T-23.6521 lnT (Dickson and Riley, 1979)

Where T is the absolute temperature in Kelvin.

Impure Water

The values of K also depend on the concentration of the solute (impurity) in the water, because the formation of a mixture of soluble ions between the ions and the carbon molecules in the solution prevents the molecules and carbon ions from fully forming. Therefore, in thermodynamic equations, concentrations must be replaced by their activity, which is slightly less than the concentration. The thermodynamic solubility of carbon dioxide in water is equal to:

28) $$K_0 = \frac{aH_2CO_3}{P_{CO2}} = \frac{\gamma_a[H_2CO_3]}{P_{CO2}}$$

Where, in general, the activity factor, γ, is less than one. However, in an ideal solution with zero soluble concentration or zero ionic strength (I), the coefficient of activity is one. In non-ideal T solutions, the thermodynamic and acidity constants of the first and second dissociation of carbonic acid are:

29) $$K_1 = \frac{a_H . a_{HCO_3}}{a_{H_2CO_3}} = \frac{\gamma_H[H^+].\gamma_b[HCO_3^-]}{\gamma_a[H_2CO_3]}$$

and

30) $$K_2 = \frac{a_H . a_{CO_3}}{a_{HCO_3}} = \frac{\gamma_H[H^+].\gamma_C[CO_3^{2-}]}{\gamma_b[HCO_3^-]}$$

In practice, pH is measured instead of $[H^+]$, so in high relationships, 10-pH is used instead of $[H^+]$. In addition, the dissociation constants are usually given as follows:

31) $pK = -\log_{10}K$ or $K = 10^{-pK}$

At low salt concentrations (less than 400 mg/L), the values of pure water dissociation constants can be corrected with the help of Debye-Huckel theory and saline water dissociation constants can be obtained. Approximate values of water dissociation constants with S salinity in mg/L are:

$$32)\ pK_1' = pK_1 - \frac{0.5\sqrt{1}}{1+1.4\sqrt{1}}$$

$$33)\ pK_2' = pK_2 - \frac{2\sqrt{1}}{1+1.4\sqrt{1}}$$

Where I is the ionic strength of water and its relation to the salinity of the water is obtained from the following approximate relation:

$$34)\ I \approx 2.5 \times 10^{-5}\ S$$

Thermodynamics of chemical reactions

Any chemical change with the capture or delivery of energy is usually accompanied by heat. Therefore, the study of these energy changes in the realm of chemical thermodynamics is a powerful tool for predicting the progress and rate of progress of a reaction. Since these predictions are information about the energy properties of reactions and their products, it is not necessary to address the reaction itself. In other words, these are the mass properties of matter, and chemical thermodynamics is a purely macroscopic perspective.

In most chemical reactions performed in the laboratory, the system usually enters the atmosphere (pressure is constant), and the test is performed at room temperature (relatively constant temperature / dispersed heat). Under such conditions (temperature and constant pressure), two useful state functions can be defined as enthalpy and Gibbs free energy. An enthalpy equals heat (qp) given or taken at a constant pressure in a process. Gibbs free energy determines whether a chemical change is thermodynamically possible. In addition, it determines the direction and magnitude of the chemical change.

Gibbs free energy function is defined as follows:

$$35)\ G = H - T.S$$

Where H is the enthalpy, S is the entropy, and T is the system temperature. Gibbs free energy is a state function. Therefore, for any change of state, the following important relation can be written:

$$36)\ \Delta G = \Delta H - T.\ \Delta S$$

In spontaneous reactions, Gibbs energy changes are always less than zero ($\Delta G < 0$). Gibbs free energy for normal reactions is calculated under standard conditions (pressure of one atmosphere, temperature of 25 °C and effective concentration of one mole per liter) and is available in different tables. The standard Gibbs free energy for a chemical reaction is calculated as follows:

$$37)\ \Delta G° = \Sigma\Delta Gf°\ (\text{products}) - \Sigma\Delta Gf°\ (\text{reactants})$$

Where

$$38)\ \Delta Gf^{\circ} = \Delta Hf^{\circ} - T.\Delta Sf^{\circ}$$

The standard Gibbs energy of a reaction is one of the properties of a reaction and does not change as that reaction continues.

It should be noted that ΔG is the maximum amount of energy that can be released from the system and do a useful job or cause a chemical reaction. One of the serious problems with the Gibbs function, especially in chemistry, is that although G has energy units, it does not have one of the most important energy properties, which is survival. Therefore, although it may decrease, energy does not need to increase elsewhere. Quantity -ΔG associated with a process represents the amount of energy that is “shared and distributed”, which means increasing the total entropy. Gibbs energy has no physical reality as a property of matter, while enthalpy and entropy can be related to the quantity and distribution of energy in a set of molecules.

Relationship between Gibbs free energy and chemical reaction equilibrium constant

Each chemical reaction has a characteristic equilibrium constant (Keq) under a set of conditions. The equilibrium constant of any chemical reaction is constant and changes only with temperature. The equilibrium constant is defined as the ratio of the effective product multiplier to the effective concentrator product of the reactants:

$$39)\ aA + bB \leftrightarrow cC + dD$$

$$40)\quad K_{eq} = \frac{[C]^c [D]^d}{[A]^a [B]^b}$$

Unlike the standard equilibrium constant and Gibbs energy of a reaction that is part of the reaction properties and does not change as the reaction continues, the Gibbs free energy of the reaction changes as the reaction continues and reaches zero if the reaction reaches equilibrium. The amount of Gibbs free energy of a reaction is related to the standard Gibbs energy and the product of the effective concentration of the products and reactants in that reaction (Q) through the following relationship:

$$41)\ \Delta G = \Delta G^{\circ} + RT \ln Q$$

Somewhere R is the constant of gases and T is the temperature in Kelvin. In the case where the reaction is in equilibrium (ΔG = 0), the above relation is rewritten as follows:

$$42)\ \Delta G^{\circ} rxn = - RT \ln K_{eq}$$

Enthalpy

Since most of the processes that take place in the laboratory, on the surface of the earth, and in living things are under the pressure of an atmosphere, the enthalpy relationship is written as the first law of thermodynamics. Enthalpy changes are a process equal to:

$$43)\ \Delta H \equiv qp = \Delta U + P\Delta V$$

When a substance absorbs heat, its temperature rises. The enthalpy of a system increases through the following relation to temperature:

$$44)\ \Delta H = CP.\Delta T$$

Because the increase in temperature causes the material to expand, the increase in enthalpy is slightly greater than the increase in the internal energy of the material. The difference between the enthalpy dependence and the internal energy to temperature is significant only for gases. Because the coefficients of thermal expansion of liquids and solids are very small. Using the Gibbs-Helmholtz relation, the enthalpy of a reaction can be attributed to the Gibbs free energy and the equilibrium constant of the reaction and can be calculated:

$$45)\quad \left(\frac{\partial\left(\frac{G}{G}\right)}{\partial T}\right)P = -\frac{H}{T^2}$$

According to the model developed by Joback et al., to estimate the equilibrium of the reactions associated with carbon dioxide entrapment in water in terms of temperature and using the Gibbs-Helmholtz relation, the enthalpy of the following reactions can be obtained:

$$46)\ 2H_2O\ (l) \leftrightarrow H_3O^+ + OH^-$$

$$47)\ CO_2\ (aq) + 2\ H_2O\ (l) \leftrightarrow H_3O^+ + HCO3^-$$

$$48)\ \Delta H^{\circ}_{rxn,\ i} = R.\ (BiT - Ci + DiT^2)$$

Where the coefficients in the above equation are extracted from Table 1.

Table 1- Constant coefficients of chemical equilibria

Reaction	Ai	Bi	Ci	Di
Equation 6	1.3598E+02	-2.2937E+01	-1.3592E+04	0
Equation 7	2.3429E+02	-3.7203E+01	-1.2216E+04	0
Equation 8	1.6148E+02	-2.7397E+01	-9.9211E+03	0
Equation 10	1.7057E+01	0	0	-3.4860E-02

The enthalpy of dissolution of carbon dioxide in water can be estimated through the temperature-dependent relationship for Henry's constants using the following equation:

$$49)\quad [\partial \ln H/\partial(1/T)] = \Delta_{sin} H/R$$

Where the Henry's constants relationship with temperature is:

$$50)\ \ln(H/MPa) = -6.8346 + 1.2817 \times 10^4/T - 3.7668 \times 10^6/T^2 + 2.997 \times 10^8/T^3$$

So by derivation we have:

$$51)\ \Delta_{sin}H = 106.56 - 6.2634 \times 10^4/T + 7.475 \times 10^6/T^2$$

Where $\Delta_{sin}H$ is in kJ/mol.

Using the Clausius–Clapeyron relation enthalpy equation, Anderson reports the reaction of carbon dioxide hydrate to carbon dioxide vapor and water as follows:

$$52)\ \Delta H_I/(kJ.mol^{-1}) = \{62.9 - 0.53(T/K - 273.15)\}$$

Entropy

Entropy is one of the most basic concepts in physics. This quantity is generally mistaken for a measure of disorder. Entropy, on the other hand, is a measure of the distribution and sharing of thermal energy within a system. As a result of this diffusion and sharing, thermal energy is dissipated over a larger volume of space or in micro-states inaccessible to the system. The thermal energy distribution in a system is determined by the number of quantized microstates available. The greater the number of these states, the greater the entropy of the system. According to this definition:

$$53)\ S = k.\ln\Omega$$

Where k is the Boltzmann constant and Ω is the number of microstates associated with a given system macrostate.

The entropy of a perfectly regular solid at zero degrees Kelvin is zero. The absolute entropy of a substance at any temperature above zero Kelvin is determined by calculating the amount of heat required to bring the temperature of the substance from zero Kelvin to the desired temperature:

$$54)\ S_{0^\circ \to T^\circ} = \int_{0^\circ}^{T^\circ} \frac{Cp(T)}{T} dt$$

It should be noted that the criterion for the spontaneity of a change is the entropy of the system and the environment, or in other words, the total entropy:

$$55)\ \Delta S\ total = \Delta S\ surr + \Delta S\ sys$$

The only way to affect the entropy of the environment is to exchange heat with the system:

56) $$\Delta S_{surroundings} = \frac{q_{surr}}{T}$$

Because most reactions are either exothermic or endothermic, they cause heat to flow through the system boundary. The change in enthalpy of reaction is defined as the flow of heat from the environment into the system in such a way that the pressure is constant. Therefore, the heat flowing from the medium is equal to -qp, which changes the entropy of the medium as follows:

57) $$\frac{-q_p}{T} = -\frac{\Delta H}{T}$$

So, we have:

58) $$\Delta S_{total} = \frac{-\Delta H}{T} + \Delta S_{sys}$$

Multiplying (-T) on the sides:

59) $$-T\Delta S_{total} = \Delta H - T\Delta S_{sys}$$

Compared to the ΔG relation, it can be said that:

60) $$-T\Delta S_{total} = \Delta G$$

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The First Scientific Journal in T-Consciousness Research

The Effect of Taheri Consciousness Fields on ATP Production in HEK-293 Cell Line by Measuring Luciferase Activity

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Abstract

Various T-Consciousness Fields with different functions have been introduced by Mohammad Ali Taheri. Not only has the existence of these fields been investigated in the initial phase through various experiments, but also the empirical evidence of Mohammad Ali Taheri's theories, such as the existence of the "mind in the matter", has been observed. This study aimed to explore the effect of Taheri Consciousness Fields (TCFs) 1, 2, and 3 in the production process of ATP or biological energy in the human cell lines. In this experiment, a human HEK 293 cell line was used in a cell culture medium at the 24th hour of growth. The luciferase enzyme, the concentration of ATP in the sample under the influence of TCFs and control was measured and evaluated. Our findings showed that TCF 1, 2, and 3 resulted respectively in a 5, 11 and 7-fold increase in the number of ATP molecules, compared to the control samples. Due to the limited fuel cell resources and the brief treatment time (one hour) with TCFs, this increase in ATP levels cannot be attributed to the normal cytosolic and mitochondrial glucose oxidation pathways. Thus, there seems to be an alternative pathway. It is possible that TCFs influenced the ionization of water molecules in the mitochondrial intermembrane space and led to more ATP production by maintaining the proton gradient. The factor that makes this possible is nothing but the existence of a type of mind in the cells. According to Taheri's theory, transmitted information through TCFs has been received by the mind of the cells, and as a result, has led to the ionization of water molecules in the mitochondrial intermembrane space. In conclusion, it seems that regardless of the biological system, under the influence of TCFs, there is an alternative way to increase ATP at the immediate time, which is associated with an increase in information and a decrease in the entropy of the system.

Keywords: Taheri Consciousness Fields; ATP; Cell mind; Entropy; Information; Luciferase; Water ionization; Glucose oxidation

Introduction

The word consciousness is defined in different ways in science and there is no general agreement on a unified definition. One of the most popular and fundamental definitions is related to Descartes' "I think; therefore, I am" (Descartes 2006, p.73) in which animals were regarded as unconscious creatures. In the 19th century, biologists such as Darwin and Loeb studied the behavioral responses of plants to light or chemicals. Plants' behavior has been an interesting area of research. There are intelligent behavioral responses in plants; for instance, Chamovitz describes the complex capabilities of a plant to process information in "What a Plant Knows" (Chamovitz, 2017). Some do not consider plants and single-celled organisms' movements an act of intelligent behavior due to the lack of a brain and nervous system, while plants, for example, breathe without lungs, move, and digest nutrients without a stomach. Bacteria also sense and respond to their environment. Therefore, intelligent behavior capabilities in organisms should not be overlooked (LeDoux, 2020).

Living cells are responsible to do a wide variety of functions including growth, movement, reproduction, etc. and most of these functions require energy. This raises two main questions, first, how do cells receive this energy and second, how do they use this energy most efficiently? Cells, in a similar way to humans, cannot produce energy without using a source in their environment; just as humans look for materials such as fossil fuels for energy, cells also search for energy in the form of food molecules or sunlight. In fact, the sun is the ultimate source of energy for almost all cells, as photosynthetic prokaryotes, algae, and plant cells use solar energy to build complex organic food molecules that other cells rely on for energy needed to maintain growth, metabolism, and reproduction.

Finally, in the cellular mechanism formed during cell evolution, the production of usable bioenergy called ATP is a common pathway between eukaryotic cells which begins in the cytosol and ends in the mitochondria (more details are provided in the °ppendix). There are several disorders in the human body associated with the improper activity of the enzyme involved in the production of ATP and in turn, its optimal production: For instance, after the presentation of various theories on the relationship between amyloidopathy and the role of Tau protein in Alzheimer's and Parkinson's disease (Tomiyama 2010). Studies have identified mitochondrial dysfunction and cellular energy deficits as the origins of these diseases (Winklhofer and Haass, 2010; Wellstead and Cloutier, 2011; Desler et al., 2018; Onyango et al., 2017; Swerdlow et al., 2017; Schägger et al., 2008; Ludtmann et al., 2018). The relationship between impaired ATP production and cardiovascular diseases, Alzheimer's disease, and Amyotrophic Lateral Sclerosis (ALS) has also been reviewed in a study (Galber et al., 2021).

In addition to the role of ATP in being an energy molecule, it is also viewed in the concept of biological information. This concept generally has different meanings. According to Shannon's definition of information, when information is increased in a system, entropy is decreased proportionally. Entropy is also a measure of the distribution and sharing of energy within a system (Shannon 1948). On the other hand, we know that in biological systems, the most useful and accessible form of bioenergy for the performance of work (quanta of useful energy) is the energy stored by glucose oxidation in ATP molecules. In fact, the increase in useful energy occurs along with the decrease in the energy available for sharing and, consequently, the decrease in the entropy of the system. Thus, according to information theory, the formation of more ATP molecules in biological systems is equivalent to an increase in useful energy, a decrease in the energy available for sharing, and in other words, a decrease in entropy. The thermodynamic calculation of the ATP production process in biological systems has also been empirically tested and confirms the reduction of entropy. The results are: (1) H^+/ATP = 4.0, independent of pH. (2) $\Delta rG'^0$ = 31.3 kJ mol^{-1} at 20 ° C, pH 8.0, pMg 2.5 and 0.08 M ion strength. (3) $\Delta rH'^0$ = 28.1 kJ mol^{-1} and $\Delta rS'^0$ = -11 JK^{-1} mol^{-1} (Pänke 1997 & Rumberg).

In addition to the thermodynamic and entropy-related interpretation of available bioenergy and in its extracellular form, ATP also acts as a neurotransmitter (information-containing molecule) in biological systems. The concept of the function of ATP and purine derivatives as extracellular signaling molecules was introduced in the late 1920s and early 1930s, when the physiological effects of adenine derivatives were discovered (Ralevic & Burnstock 1998). In the 1970s, this approach culminated in a study of purine neurotransmission mediated by specific plasma membrane receptors called purinoceptors (Burnstock 1978).

Thera are chemical and pharmacological studies in which changes in ATP production have been investigated. For example, several studies have been conducted on cancer cells and prevention of their replication (Wang et al., 2021) as well as chemical and physical methods to increase ATP production by regulating intracellular calcium (Distelmaier et al., 2009) or under the influence of magnetic fields during more than 6 hours without limitation in raw materials by about 2.5 times the enzymatic state (Buchachenko & Kuznetsov 2008). Using consciousness at the cellular level and by measuring energy production in ATP is completely novel and unprecedented.

The nature of consciousness and its place in science has received much attention in the current century. Many philosophical and scientific theories have been proposed in this area. In the 1980s, Mohammad Ali Taheri introduced novel fields with non-material/non-energetic nature named Taheri Consciousness Fields (TCFs). In this perspective, T-Consciousness is one of the three existing elements of the universe apart from matter and energy. According to this theory, there are various TCFs with different functions, which are the subcategories of a networked universal internet called the Cosmic Consciousness Network (CCN). The major difference between the theory of TCFs and other theoretical concepts about consciousness is related to the practical application of the TCFs. These fields can be applied to all living and nonliving creatures, including humans, plants, animals, microorganisms, materials, etc.

Mohammad Ali Taheri, the founder of Erfan Keyhani Halqeh, a school of thought, introduced a new science in 2020 as a branch of this school. He coined the term Sciencefact for this new science because it utilizes scientific investigations to prove the existence of T-Consciousness as an irrefutable phenomenon and a fact. Although science focuses solely on the study of matter and energy, Sciencefact, by contrast, explores the effects of the non-material/non-energetic TCFs; Sciencefact has provided a common ground between the two by conducting reproducible laboratory experiments in various scientific fields, and it has used the scientific approach in proving TCFs.

The influence of the TCFs begins with the connection between CCN as the Whole Consciousness of the universe and the subjects under study. This connection, called "Ettesal", is established by Faradarmangar's mind (a certified and trained individual who has been entrusted with the TCFs). The human mind (the Announcer) has an intermediary role that initiates the Ettesal by imparting a swift and brief attention to the object under study. The observed effect is, therefore, solely the result of the TCFs affecting the system. These fields cannot be directly measured by scientific means, but it is possible to investigate their effects on various subjects through reproducible laboratory experiments (Taheri 2013).

The research methodology in the study of T-Consciousness has been founded on the process of Assumption, Argument, and Proof, in which the basic Assumption is: The Cosmos was formed by a third element called

T-Consciousness that is different from matter and energy.

The Argument: The existence of TCFs can be demonstrated by their effects on matter and energy (e.g., humans, animals, plants, microorganisms, cells, materials, etc.)

The Proof is the scientific verification of the effects of TCFs on matter and energy (according to the Argument) through various reproducible scientific experiments.

Accordingly, to investigate and verify the existence, effects and mechanisms of TCFs, the following five research phases (Phases 0 through 4), and the aims of each phase are outlined below.

Phase-0 studies aim to prove the existence of TCFs by observing their effects. The nature of T-Consciousness and what it is will not be addressed in this phase. Phase-1 explores the varied effects of different TCFs. Phase-2 examines the reason behind the varied effects of these fields. Phase-3 investigates the mechanism of TCFs effects on matter and energy. Finally, Phase-4 draws significant conclusions, particularly with regard to the mind and memory of matter and their relation to the T-Consciousness, etc.

According to the theory of TCFs, the energy commonly consumed in life is ATP, the rate of production of which is constant and it is impossible to produce a large amount of ATP in short time; in other words, regardless of the synthesis of ATP in mitochondria, there is an alternative way to produce immediate energy. Therefore, this way is completely independent from metabolism.

The aim of this study is to investigate the effect of three different TCFs on HEK-293 cell lines in ATP production through reproducible experiments and to screen the effect of these fields on conventional bioenergy production.

Materials and Methods

In this study the following materials were used: ATP (Roche), D-luciferin potassium salt (Resem, The Netherlands), Fetal bovine serum (FBS) (BIO-IDEA), Dulbecco's modified Eagle's medium (DMEM) (BIO-IDEA), Penicillin/streptomycin (BIO-IDEA), Trypsin-EDTA 25% (BIO-IDEA), Tris-HCl (Merck), NaOH (Merck), $MgSO_4$ (Merck), PMSF.

Application of the TCFs: The TCFs were applied to the samples according to protocols developed by the COSMOintel research center (www.COSMOintel.com). A request for connection to CCN to utilize TCF1 can be submitted through the COSMOintel website in the “Announcement” section. This access is available to the public at no cost. To study and experience this connection, researchers can register on the website above at any time and report the experiment to the COSMOintel research center. It is necessary to provide the center with the design and details of the experiments; for example, the number and the type of cases need to be specified.

The current experiment was performed as a double-blind study where the lab technicians were completely unaware of the TCFs theory, and the Faradarmangar at the COSMOintel research center who established the Consciousness Bond was blinded to the details of the study. In this study, the TCFs were applied once in the last hour of the study.

Cell culture

Human embryonic kidney cells (HEK-293) were cultured in a controlled environment in a 6-well cell culture plate (4×10^5 cells) in DMEM supplemented with 10% FBS and 1% penicillin/streptomycin at 37 °C with 5% CO_2. After one hour, cell treatment, the surface of each well was drained and washed with a PBS buffer and a certain amount of trypsin (1X 0.25% trypsin-EDTA) was added to each well.

Then, the plate was placed at 37 °C for 5 minutes, and following that the effect of trypsin was neutralized with a volume of 300 µl of culture medium, and cells were collected from the bottom of the wells and finally, centrifuged at 1200 rpm for 5 minutes. Precipitated cells were stored in a -80 freezer until performing the ATP assay. Luminometer (Berthold Technologies GmbH & Co.KG) was used to perform ATP assay and read the luciferase activity.

Cell lysis

In order to lyse the cells, 30 µl of CCLR buffer (Tris 50 mM, NaCl 150 mM, Triton x-100 1%, PMSF 0.1 mM - pH 6.9) was used.

The CCLR buffer was added to the cell sediments and was incubated on ice for about 20 minutes, and then centrifuged at 13000 rpm for 15 minutes at 4 °C before the supernatant was used for the ATP assay.

ATP assay

Before processing the samples, an ATP standard curve should be made. The serial dilution of ATP in the concentration range of 0.001-1 mM was prepared. The luciferase enzyme was then dialyzed in a 50 mM Tris buffer for 24 hours to remove ATP contamination. Finally, in order to measure the amount of ATP in the treated cells in a 1: 1: 1 ratio of the dialyzed luciferase enzyme, luciferin and cell lysis were mixed in a tube and luciferase count was read by a luminometer (Jouaville et al., 1999).

Statistical analysis

Data were analyzed using GraphPad Prism software version six. The values were expressed as mean ± standard error and analyzes were repeated at least three times. Then two-way variance analysis followed by multiple comparisons with 95% confidence intervals was performed and significant values less than 0.05 ($p < 0.05$) are presented.

Results

Measurement of the produced ATP in cells under the influence of the three TCFs

Due to the treatment of TCFs in the last hour of this study, the data related to the changes in the amount of ATP made in HEK-293 cells were calculated and normalized per the last hour of the present study. In this normalization, within 24 hours of this study, the number of cells has tripled (from 400,000 to 1,200,000), therefore, the average number of ATP produced per hour in the control in the last hour (time of comparison of samples with control) was considered three times the average (1.41E+17). Accordingly, as shown in Table 1, in comparison with the control samples, the concentration changes per final hour of treatment increased in the samples under TCFs 1, 2 and 3 by 5, 11, and 7-fold, respectively.

Table 1. Differences in cellular ATP levels in control and samples of this study

Sample	[ATP]/mM	No. of ATP	No. of ATP/ (last) hr	Production Rate (No. of ATP/cell/ last hr)	Relation to Basal Rate in 1 hour
Control	0.006	3.52E+18	4.40E+17	3.67E+11	1
TCF1	0.009	5.47E+18	2.39E+18	1.99E+12	5
TCF2	0.013	7.95E+18	4.87E+18	4.05E+12	11
TCF3	0.010	6.28E+18	3.20E+18	2.67E+12	7

*TCF: Taheri Consciousness Fields

Concentration of glucose required to produce the measured amount of ATP

The normal process of ATP production in living cells begins in the cytosol and is completed in the mitochondria and in the oxidative phosphorylation process. The glucose molecules have been considered as a limiting factor in this pathway, however, the same cannot be said for ATP precursors (e.g., ADP and Pi) because they are produced through the metabolic mechanism of the cell.

According to stoichiometry obtained from the process of cellular metabolism, assuming the conventional number of ATP produced by cells, per molecule of glucose (each molecule of glucose producing 32 molecules of ATP) and based on the data of produced ATP concentration measured in cells in culture medium, other values related to the number of glucoses required for oxidation and its theoretical oxidation rate are given in Table 2.

Table 2. Estimated glucose required to produce the amount of ATP produced in the control and samples of this study

Sample	Total ATP per total cells /last hr	Total required Glc/No.	Required Molarity of Glc/ mM	Required [Glc] (gr Glc/lit)	Required [Glc]/ Primary DMEM [Glc]	Theoretic Lysis rate/ µM/s
Control	4.40E+17	1.37E+16	5	0.86	0.19	1.32
TCF1	2.39E+18	7.46E+16	26	4.65	1.03	7.17
TCF2	4.87E+18	1.52E+17	53	9.48	2.11	14.62
TCF3	3.20E+18	1.00E+17	35	6.24	1.39	9.62

*TCF: Taheri Consciousness Fields

The DMEM culture medium with a high glucose type (4.5 g/l) was used in this study. The cells spent 24 hours in the culture medium at the time of calculating the values in Table 2, so the initial amount of glucose has decreased. As shown in Table 2, the control in this study, in order to make the measured amount of ATP, must have at least about 5 mM or 0.86 g/l intracellular glucose concentration, which according to the initial concentration of glucose in the environment (4.5 g/l), the amount of glucose required by the cell for this target is about 19% of the initial glucose concentration at the time of measuring. However, the amount of glucose required to provide the energy needed to produce the amount of target ATP in the case of samples affected by the TCF 1, 2 and 3 is 103%, 211% and 139% of the initial glucose content, respectively. it is important to note that this is a minimal estimate because all the glucose in the culture medium is considered in the cytosolic environment of the cell and the absorption efficiency is less than 1 and the energy loss due to natural and vital processes are not taken into account, an amount of 10-20% should be added at minimum to the glucose usage values. Moreover, considering stoichiometries of ATP production per one molecule of glucose (about 38), and other carbonaceous substances such as glutamine in the cell culture, and from the calculations in Table 1, the amount of glucose required for samples influenced by the TCF 1, 2 and 3 would be 87%, 177% and 117% of the amount of primary glucose, respectively. Again, given the amount of ATP needed for growth and proliferation and at the time of assay, these amounts of glucose are not available to the cells at the time of assay.

In fact, it is basically not possible to have more than the amount of primary glucose in the culture medium after 24 hours, to be used for production of ATP as a result of the influence of the TCFs. In particular, the required glucose for ATP production in TCF2-treated cells was more than double the primary glucose in the culture medium. This means that this amount of glucose did not exist from the beginning in the experimental conditions in samples affected by the TCFs.

In addition, the last column of Table 2 shows the theoretical glycolysis rate calculated for the controls and samples in this study. According to the methods of measuring the rate of glycolysis in cellular dimensions, in muscle and nerve cells (which have the highest rate of glycolysis among somatic cells), the rate of glycolysis is about 8 and 2.5 micromolar per second, respectively. In Hela cancer cells, it is about 6 micromolar per second (Bittner et al., 2010). This number is about 1.32 micromolar per second for control; and the renal somatic cell line under the TCFs during one hour of treatment, showed between about 7 to 15 micromolar per second glycolysis rate which is close to nerve cells and more than twice of Hela cancer cells. Due to the basic and evolutionary features of the cell line of this study, this change is practically not possible during the short time of the application of the TCFs.

Energetics calculation of ATP production process at the cell level and ATP synthase microenvironment (in mitochondrial):

According to the classic biochemistry textbooks, the amount of energy required to produce ATP is 30.8 kJ per mole (Prat 2021). This amount of energy is reported in some studies in natural conditions of cells in the range between 50-60 kJ per mole and in a study in mitochondria of rat liver is estimated at 64 kJ per mole (Slater et al., 1973).

On the other hand, its theoretical value is estimated between 69 to 81 kJ/mol (for electromotive force -180 to -210 mV) (Müller & Hess 2017). The energy required to produce ATP is attributed to the force due to the difference in the concentration of hydrogen ions (protons).[1] The energy generated by the transfer of each hydrogen ion across the inner mitochondrial membrane and the resulting membrane potential difference (measured only for microorganisms is estimated in the range of -150 to -210 mV) is equal to a minimum of -14.5 kJ per mol to a maximum of -20.2 kJ per mol (Müller & Hess 2017).

In all the calculations of this study and based on the thermodynamic data extracted from the experiment and under standard conditions, the Gibbs energy of the ATP production process is 31.3 kJ / mol. In order to achieve an enthalpy of 28.1 kJ per mol of ATP made in proportion to the selected Gibbs energy, the required amount of proton free energy is about 19.8 kJ per mol with a stoichiometry of 3:1 which is within the range of empirical and theoretical data and is acceptable. The entropy under these conditions will be -10.7 joules per mole per Kelvin. Also, the measured enthalpy of formation of each molecule of ATP from the breakdown of one glucose molecule is equal to about 90 kJ per mole (the relevant information is given in Table 1 and Table 6).

The baseline rate of ATP production per last hour of the study (time of treatment by the TCFs) was calculated based on the energy of ATP molecule production, proton transfer, heat released at the cell and mitochondria level in the control and is presented in Table 3 and this amount in differential mode for samples, in comparison with control is illustrated in Table 4.

1 Proton Motivation Force

Table 3. Baseline ATP production rate calculated based on control data for one final hour with the energetics of the process of making ATP molecules, the heat released in exchange at the level of mitochondria and cells of this study and its equivalent temperature.

	Mole of ATP	Mole of H^+	Q-mitochondria (kJ)	ΔT-mitochondria/K	Q-Cell (kJ)	ΔT-Cell/K
Control (basal rate)	7.31E-07	2.19E-06	3.54E-02	8	6.58E-05	3

Table 4. The rate of ATP production calculated in a differential from the control data (Table 3) per final hour with the energetics of the process of making ATP molecules, the heat released in return at the level of the mitochondria and cells of this study and their equivalent temperature

Sample	Δ Mole of ATP	Δ Mole of H^+	Δ Q-mitochondria (kJ)*	ΔT-mitochondria/K	Q-Cell (kJ)*	ΔT-Cell/K
TCF1	3.24E-06	9.71E-06	9.09E-05	37	2.91E-04	13
TCF2	7.35E-06	2.21E-05	2.07E-04	85	6.62E-04	29
TCF3	4.59E-06	1.38E-05	1.29E-04	53	4.13E-04	18

*TCF: Taheri Consciousness Fields

* The total number of cells at the end of the study is about 1,200,000 and the amount of intracellular water in eukaryotic cells based on literature is 0.0000000044 ml, with a density of 1.008 g / ml, and the total estimated amount of mitochondrial water is at about 12% of the total cell water (Bolender & Weibel 1973).

As can be seen from the data in the previous sections, the results confirm the impossibility of producing high amounts of ATP in the samples as a result of cell and mitochondrial proliferation and promotion of enzymatic function as well as glucose oxidation as "cell fuel". Also, in completing the data in the previous sections, as shown in Table 4, by calculating the enthalpy of the general pathway of glucose oxidation in cells and considering the difference between the energy stored in ATP molecules and obtained from the transfer of H^+ ions, which is released in the environment as heat, we expect temperature changes in cells and microenvironment of ATP synthase to be about 3 °C in the case of control and 8 °C per cell population and mitochondrial space. These changes are within the temperature tolerance range of cell and mitochondrial (Chrétien et al., 2018).

However, in the samples, the temperature is expected to increase between 13 °C and 29 °C for the cells and 37 °C to 85 °C for the mitochondria during the one hour of treatment with the TCFs. Obviously, such a rise in temperature, cell death, enzyme denaturation, and mitochondrial destruction must occur in the last hour of the study instead of a surprising increase in energy of the biological system outside the basic nature of the biological system. In fact, according to the data, it can be concluded that the conditions of bioenergy production in control are in accordance with normal conditions, but in the case of samples, it is undoubtedly impossible to produce these amounts of ATP according to conventional biological mechanisms.

Discussion

The results of investigating ATP production showed that TCF 1, 2 and 3 causes a 5, 11 and 7 times increase in ATP compared to the control. It has been reported that the increase in cellular ATP levels is possible under the influence of metabolic shocks (Mookerjee et al., 2017) and environmental conditions (including the application of magnetic fields (Buchachenko & Kuznetsov 2008)) which is about 2.5 times in at least several hours after the relevant treatment, and in some cases, depending on the energy of the magnetic field, we face a decrease of more than this amount. The observation of an increase of 5-11 times, particularly, in a period of 1 hour without applying material and energetic changes in the cell culture medium, seems completely mechanistically and materially unachievable. There are possibilities that may cross our mind for this observation, including an increase in the number of cells treated with the TCFs; but considering that in this study, before the cell lysis stage (24 hours), the number of cells in the sample and control was approximately 1,200,000 (tripled in 24 hours), an increase in the number of ATP in the samples, which is 5-11 times higher, could not be due to an increase in the number of cells and, consequently, an increase in the number of total mitochondria. In addition, previous studies have shown that the effect of the TCFs on increasing the proliferation of healthy and cancer cells was less than 20% (Taheri et al., 2022a; Taheri et al., 2022) and the observed change in ATP levels in this study is very different. About a possible increase in the number of mitochondria, it is to be noted that the time required for mitochondrial proliferation is more than the one hour of the TCFs treatment. Similarly, an increase in the number of ATP synthase in mitochondria cannot be the reason for this increase, because the formation of this enzymatic complex with 17 subunits requires the participation of nuclear and mitochondrial genes, which take more than an hour. There are different amounts of ATP synthase in the mitochondrial inner membrane depending on the cellular metabolic requirements, and some of them are active. In a certain condition, most of them can be activated by about 2 to 3 times.

A significant increase of 5-11 times of ATP with this probability is also not justified. In previous studies on enzymatic activity, an increase in catalytic capacity between 5-20% under the influence of the TCFs has been observed (Taheri et al, 2022b and c). In this experiment, the rate of increase in ATP as a final product is about 500-1100% and cannot be attributed to the increase in the catalytic capacity of the enzyme under influence of the TCFs.

According to the stoichiometric calculation of mitochondrial function efficiency, it was determined that the amount of energy sources and glucose in the culture medium is much less than the amount required to increase ATP. In addition, the theoretical glycolysis rate obtained for the samples under influence of the TCFs shows a 5-11-fold increase compared to the control, which may not be possible due to the short period of time of treatment as well as the type of cell line. Therefore, this significant increase in ATP cannot be attributed to glucose oxidation as a cellular fuel. By calculating the energy of the ATP production process, we expect temperature changes in the cell and mitochondria for the samples to increase between 13°C and 29 °C for the cells and 37 °C to 85 °C for the mitochondria. Obviously, this is not possible because it may cause enzyme denaturation while we observed an increase in ATP production under the influence of the TCFs.

In general, based on the obtained data, ATP production influenced by the TCFs cannot be achieved through normal biological processes; The four limitations for this purpose in biological system are as follows: (1) Lack of sufficient amount of glucose to provide the required fuel for the cell and consequently insufficient number of NADH and FADH2 to create and maintain a proton gradient in the mitochondria; (2) renal somatic cell was used in the present study, however, the obtained glycolysis rate was higher than expected for cancer cell and around the nerve cell, which is not possible; (3) the influence period of the TCFs was less than an hour, which is not enough to provide the biological needs of this process, and (4) the impossibility of the release of a lot of energy in a short time (immediate energy) in a limited cellular space (energy limitation), meaning that in biological systems, the catabolic pathways of glucose oxidation have evolved in way that energy is released from glucose breakdown in a phased process and at specific intervals in the space of the cell cytoplasm and mitochondrial matrix during more than 20 reactions; Otherwise, the fuel of each glucose molecule at a shorter and smaller time and place will cause overheating and cell death. The question that arises with respect to the above limitations is how the sample cells, which have the same conditions as the control, produce such a significant increase in ATP under influence of the TCFs without sufficient time and resources (matter and energy)? In response to this key question, based on the theoretical concept of TCFs, the proposed mechanism for increasing ATP is related to a kind of interaction between the TCFs and the mind (software) of the cells. In this way, according to Taheri and previous observations, our interpretation is as follows:

1. Ionization of water molecules under influence of the TCFs:

In a previous study, we observed that the effect of the TCFs on water molecules can lead to an increase in H^+ or a decrease in pH (up to 1 unit less than control). As it has been mentioned in the introduction section, proton gradient in the intermembrane space of mitochondria provides required energy for ATP production by ATP synthase molecules in the inner mitochondrial membrane, which normally oxidizes electron carrier molecules including NADH and FADH2 (formed in the anaerobic and aerobic pathways of glucose oxidation) and the entry of H^+ into the space between these two membranes.

Due to the four limitations mentioned, the proposed pathway for increasing H^+ under influence of TCFs in the conditions of this study is the ionization of water molecules in the intermembrane space of mitochondria. By applying the TCFs, this alternative pathway can maintain the proton motive force across the inner mitochondrial membrane through water ionization instead of the usual pathway (oxidation of NADH and FADH2 as electron-carrier molecules and entry of H^+ into the intermembrane space of mitochondria). In this case, the proton concentration difference between the space between the membrane and the mitochondrial matrix must be kept constant: “Three molecules of water need to be decomposed to make up for the three protons consumed in one ATP production”.

Table 5 presents the reactions and thermodynamics of the water ionization process and ATP production in the alternative pathway. In Table 6, for a better comparison, using the data in Tables 1 and 5, the thermodynamic parameters of the total biological pathway reaction and the alternative pathway under the influence of TCFs for the production of each ATP molecule are provided.

Table 5. Reactions related to the proposed pathway of ATP production under the influence of TCFs in this study and its thermodynamic parameters

Reaction name	Chemical Reaction/Stoichiometry	ΔG°/kJmole^{-1}	ΔH°/kJmol^{-1}	ΔS°/ Jmol-1K^{-1}
Water ionization	H_2O (liq.) → H^+ (aq.) + OH^-(aq.)	-79.9	-55.8	+80.8
ATP production	ADP + Pi → ATP	+31.3	+28.1	-10.7

Table 6. Comparison of thermodynamic parameters of alternative pathway of bioenergy production (water ionization model) with thermodynamic parameters of general reaction and oxidation of electron carriers of normal biological pathway; All parameters are in the normalized state for the production of one ATP molecule.

Pathway	Reaction	Stoichiometry	ΔG*/ $kJmol^{-1}$ per ATP	ΔH/ $kJmol^{-1}$ per ATP	ΔS/ $JK^{-1}.mol^{-1}$ per ATP
Conventional biologic pathway	Glucose oxidation	1/32 Glc:1 ATP	–89.69	+90	+602
Alternative pathway under influence of TCFs	Water ionization	3Water:1ATP	-239.7	-167.4	+242

As can be seen in Table 5, ionization of water is a spontaneous process (Gibbs free energy is negative) and endothermic. Basically, this reaction is equilibrium. However, according to the hypothesis presented in this study, water ionization is responsible for providing an H^+ gradient across the inner mitochondrial membrane and it provides the energy needed to produce the amount of ATP obtained in this study. According to the data in Table 6, by comparing the two energy supply paths required to create a proton gradient between the two mitochondrial membranes and the production of ATP, we reach the following conclusions:

A. The amount of free energy required to form each ATP molecule, during normal biological reactions (oxidation of each molecule of glucose - about 90 kJ/mol), is approximately 1/3 of the required energy in the proposed alternative pathway (water ionization - approx. 240 kJ /mol); Therefore, from the perspective of energy efficiency, this alternative path does not occur in the normal state, since the biological evolutionary path of energy production is optimal.

B. Conventional biological reactions are extremely exothermic in general, and its biological staging over more than 20 reactions, from the cellular cytoplasm to the mitochondrial matrix and the inner membrane of the mitochondria, has been a way to energetically make it feasible. In contrast, the alternative pathway under the influence of the TCFs is endothermic and prevents the rise of cell heat.

C. Increasing entropy in the alternative pathway (242 joules per mole Kelvin) is about 60% lower than biological pathway (602 joules per mole Kelvin); this implies the negantropic effect of the TCFs compared to the normal biological conditions. This conclusion is in concurrence with the previous study in which the effect of the TCFs on water molecules was investigated (Current Issue, pp. 6-32).

Based on these results, in order to produce high amounts of ATP, the hypothesis of substitution of water ionization (in the space between two mitochondrial membranes) in the role of the provider of the required proton gradient (equivalent to glucose) is proposed. This reaction, with a 1:3 stoichiometric reaction of water ionization and ATP production reaction under influence of the TCFs, produces very high amounts of bioenergy (5-11 times normal) in a short time (immediate energy) that is beyond the evolutionary potential of biological cells.

It is to be noted that the proposed alternative pathway is based on the results of the current study. The authors are going to complete the data by designing further experiments. Such as calculating the amount of glucose in the cell culture medium before and after applying TCFs, measuring pH changes in the culture medium and even mitochondria, as well as ATP production in bacterial cells.

2. Existence and function of cell management software (mind):

Previously, the effect of TCFs on materials led to changes in their behavior that required very high temperatures (or very high energies) (Taheri et al., 2022d) in laboratory. According to Taheri's theories, this observation has been attributed to the existence of the mind body in matter. In other words, this behavior, with the presence and function of mind and memory in matter and the functional mechanism of state change of the mind of matter has been proved and interpreted under the influence of the TCFs (Taheri et al., 2022e).

According to Taheri's theory, the mind has different levels, including the basic mind (common) (the mind of matter, which is the common basis in the universe and includes the pure matter software program), the intrinsic mind (biological) (including the human, animal, plant, microorganism) and the perceptual mind (specific to humans, which provides the ability to ask questions, be aware of its own existence and perceptual concepts). During the experiments, we have observed behaviors at the level of matter as well as in water molecules that are not possible without the existence of mind body (matter software program) and the transfer of information through it; especially since under the influence of the TCFs, there is no material and energetic intervention, and it begins only through the mind of the *announcer* and through a swift and brief attention to the TCFs.

What is observed in the present study, similar to the material, is at the level of living cells and in the process of ATP production in the mitochondria of the HEK-293 cell line, which suggests the existence of mind in living cells. In fact, the TCFs in interaction with the mind or the cell management software cause a new behavior that in this experiment, advances the ionization reaction of water molecules and maintains the necessary proton gradient under the influence of TCFs. This treatment led to enhanced ATP production (between 5-11 times the normal biological states) under the exact same conditions as the control. Detailed explanations of the type of energy required for this process and the role of cell management software and the provision of empirical evidence from the studies will be published in a review article by the authors of the present study.

3. Decrease in entropy and increase in cellular information:

According to Taheri's theory, T-Consciousness influences the world of matter and energy through information. In other words, under the influence of the TCFs, data and information (from the position of Whole Consciousness or CCN) transfer to the object under study and lead to an increase in energy (and consequently an increase in ATP). To illustrate, the law of conservation of matter and energy is presented by Taheri as conservation of "information, matter and energy". Since there is currently no direct measurement of information and the study of the relationship between the new law of conservation of information, matter and energy, using information theory accepted by the world of science, the information changes in cells under the influence of the TCFs will be discussed and analyzed by the authors of the present study in a separate review article.

Conclusion

1. The increase in the amount of cellular ATP in the samples compared to the control indicates a significant effect of the TCFs on the bioenergy production.

2. Considering the multiple biological limitations mentioned in the discussion section, it is not possible to produce bioenergy according to the normal biological pathway of ATP production in sample cells under the influence of the TCFs.

3. Considering the thermodynamics of the alternative pathway reaction of bioenergy production under the influence of the TCFs (ionization of 3 water molecules) compared to the set of normal biological pathway reactions (more than 20 reactions in different cell regions from cytoplasm to mitochondria), which are generally exothermic and entropy-increasing, the alternative pathway is the only available and suitable option for supplying energy between 5 and 11 times in short time (immediate energy). Interestingly, this amount of energy is released at the optimal temperature of the cell and without disturbing the cell mechanism. Moreover, a decrease in the entropy occurred in an alternative pathway by about 60% compared to the usual biological pathway. This amount of entropy reduction, considering the general conditions similar to the sample and control in this study, seems to play a significant role in maintaining homeostasis (steady state) of the living system.

4. Changes in the cellular metabolic behavior necessarily require energy supply. What can be seen in this study is that the treatment of the TCFs provides this energy under the management of the mind (or software) of the cell through a different way from the evolutionary path. This alternative pathway occurs as a result of information received under the TCFs and by changing the behavior of cells, to advance the ionization reaction of water and maintain the proton gradient in the mitochondrial intermembrane space to produce bio-immediate energy. According to Taheri's theories, there is software behind the cell's visible physical body (hardware). Therefore, this change in cell behavior occurs by transferring information received through the interaction between TCFs and the mind (or software) of the cells. This observation is consistent with previous findings related to the existence of mind in matters (Taheri et al., 2022e).

5. The enhancing effect of TCFs on ATP production in the cell associated with entropy reduction confirms the information received from the TCFs, which lead to an increase in system information (according to law of conservation of information, matter and energy presented by Taheri).

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Conflict of interest

The authors report no conflict of interest.

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Appendix: Basics of ATP Bioenergy Production[1]

Cellular nutrients come in many forms, including sugar and fat. To provide power to a cell, these molecules must pass through the cell membrane, a membrane that acts as a barrier - but not an impenetrable barrier. The plasma membrane is like the outer walls of a semi-permeable house.

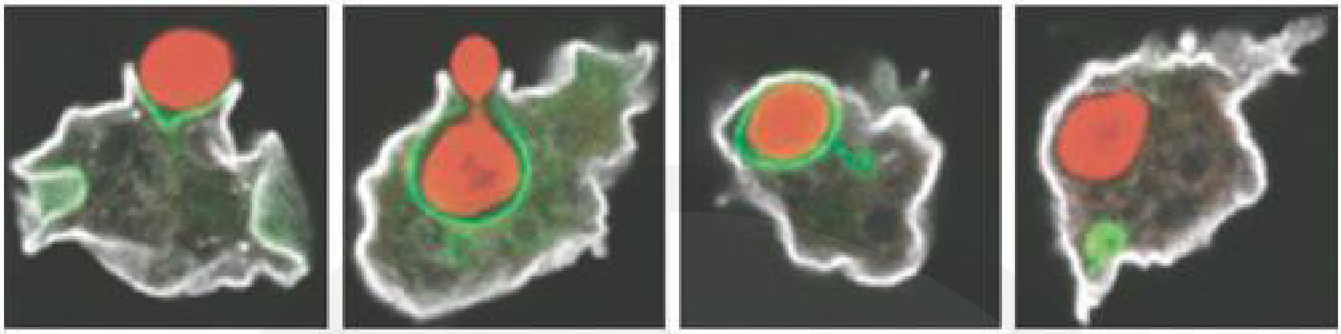

Figure 1: Cells can receive nutrients through phagocytosis. An amoeba, a single-celled organism, obtains energy by absorbing nutrients in the form of a (red) yeast cell. Through a process called phagocytosis, the amoeba surrounds the yeast cell with its membrane and pulls it in.

Complex molecules of organic foods, such as sugars, fats, and proteins, are rich sources of energy for cells because most of the energy used to form these molecules is literally stored in the chemical bonds that hold them together. Instead of burning all their energy in a large reaction, cells release energy stored in their food molecules through a series of oxidation reactions. Oxidation describes a chemical reaction in which electrons are transferred from one molecule to another, altering the composition and energy content of the donor and receptor molecules. Food molecules act as electron donors. During any oxidation reaction involved in the decomposition of food, the reaction product has lower energy content than the electron molecule that previously moved in the path. At the same time, electron-acceptor molecules capture some of the energy lost from the food molecule during each oxidation reaction and store it for later use. Finally, when the carbon atoms of a complex organic food molecule are completely oxidized at the end of the reaction chain, they are released as waste and in the form of carbon dioxide (Albert et al., 2002).

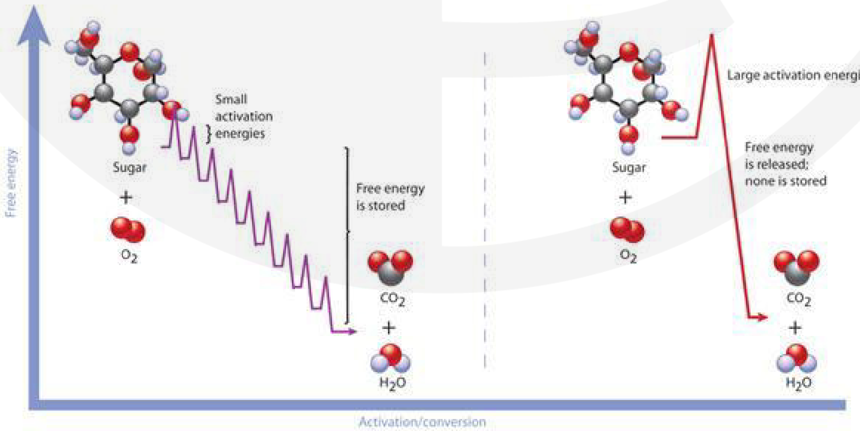

Figure 2. Step-by-step oxidation (left) versus direct burning of sugar (right). In small steps, Gibbs energy is released from sugar and stored in carrier molecules in the cell (ATP and NADH). Direct burning of sugar requires more activation energy. In this reaction, the same total free energy is released as in stepwise oxidation, but none is stored in the carrier molecules, so most of it is lost as heat. Direct combustion is therefore very inefficient because it does not inhibit energy for later use (details of reactions are given in Table 1).

1 All figures in this section are taken from multiple free educational resources.

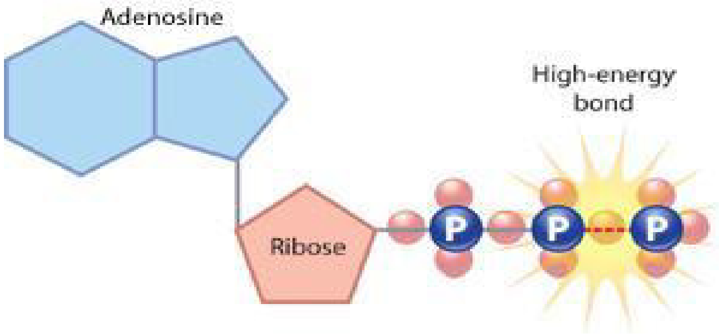

Figure 3. ATP molecule; It consists of an adenosine (blue) base, a ribose sugar (pink) and a phosphate chain. High-energy phosphate bonding in this phosphate chain is the key to ATP energy storage potential.

Cells do not consume energy from oxidation reactions as soon as they are released. Instead, they convert it into small, energy-rich molecules such as ATP and nicotinamide adenine dinucleotide (NADH), which can be used throughout the cell to boost metabolism and build new cellular components. Adenosine 5'-triphosphate, or ATP, is the most abundant energy-carrying molecule in cells. This molecule is made up of a nitrogen base (adenine), a ribose sugar and three phosphate groups.

Mitochondria: A key organ of cellular energy production

Mitochondria are key organelles that make up about 12% of the mass of each cell in liver cells. It is described as a cell power plant which is surrounded by two membranes and has its own genome. They also divide independently of the cell. This means that mitochondrial proliferation is not associated with cell division. Some of these features of this cellular organ belong to the ancient ancestors of mitochondria. Mitochondria are thought to have originated from an ancient coexistence; when an early nucleated cell swallows an aerobic prokaryote (bacterium). The ingested bacteria depend on the host cell's protective environment, and the host cell relies on the prokaryotic cell to produce energy. Over time, the ingested prokaryotes became mitochondria. Today's mitochondria bear significant similarities to some modern prokaryotes; For example, the inner mitochondrial membrane contains electron transfer proteins such as the plasma membrane of prokaryotes, and mitochondria have the prokaryotic cyclic genome.

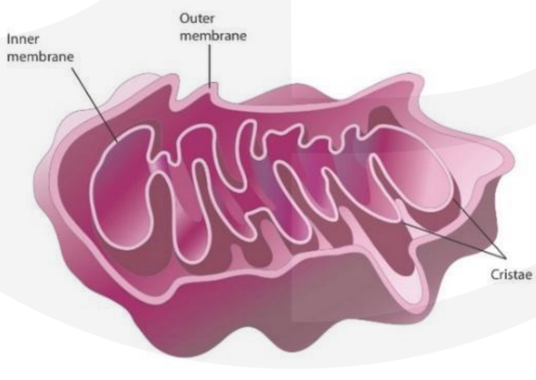

Figure 4. Membrane organization of a mitochondria

Energy production processes from materials in biological systems

Eukaryotic cells use several main processes to convert the energy contained in the chemical bonds of food molecules into more usable forms (details of all reactions are given in Table 1). Glycolysis: The first process in the release of energy in eukaryotic cells, glycolysis involves about 10 reactions, which literally means "breaking down sugar". During glycolysis, each molecule of glucose is broken down and eventually converted into two pyruvate molecules. Glycolysis is actually a series of ten chemical reactions that require two molecules of ATP. This input is used to produce four new ATP molecules, meaning that glycolysis leads to a net increase in two ATPs. It also produces two NADH molecules that act as electron carriers for other biochemical reactions in the cell.

Glycolysis is the old and main pathway of ATP production that occurs in almost all cells (eukaryotes and prokaryotes) equally. This process takes place in the cytoplasm of the cell and does not require oxygen. But the fate of pyruvate produced during glycolysis depends entirely on the presence of oxygen. In the absence of oxygen, pyruvate cannot be completely oxidized to carbon dioxide, so different intermediates are created. For example, when oxygen levels are low, skeletal muscle cells rely on glycolysis to meet their intense energy needs. This reliance on glycolysis results in the formation of an intermediate called lactic acid, which can cause a person's muscles to feel "on fire." Similarly, yeast, a single-celled eukaryote, produces alcohol (instead of carbon dioxide) in the absence of oxygen.

Krebs cycle: When oxygen is available, the pyruvates produced by glycolysis become the entrance to the next section of the eukaryotic energy pathway. During this stage, each pyruvate molecule enters the mitochondria from the cytoplasm, where it is converted to acetyl CoA, a two-carbon energy carrier, and its third carbon combines with oxygen and is released as carbon dioxide; At the same time, a NADH carrier is being produced. Acetyl CoA then enters a pathway called the Krebs cycle (citric acid), which is the second major energy process used by cells. The eight-phase cycle of citric acid produces three more NADH molecules and two more carrier molecules ($FADH_2$ and GTP). This step is about 8 reactions in total and is repeated twice per glucose.

Oxidative phosphorylation: Another process in the eukaryotic energy pathway involves an electron transfer chain that is catalyzed by several protein complexes located inside the mitochondrial inner membrane. This process, called oxidative phosphorylation, takes electrons from NADH and $FADH_2$ and transports them through membrane proteins, eventually to oxygen, where they combine to form water. As electrons move through protein complexes in the electron transport chain, a gradient of hydrogen ions or protons forms across the mitochondrial membrane. The cells harness the energy of this proton gradient to create three more ATP molecules for each electron moving along the chain. The reactions of this step are the three main reactions of the oxidation of electron carriers.

In general, the combination of the citric acid cycle and oxidative phosphorylation produces much more energy than glycolysis; Something close to 15 times the energy per molecule of glucose. In general, the processes that take place inside the mitochondria, the citric acid cycle, and oxidative phosphorylation are called respiration, a term used for processes that combine the absorption of oxygen and the production of carbon dioxide.

The electron transfer chain in the mitochondrial membrane is not the only chain that produces energy in living cells. In plants and other photosynthetic cells, chloroplasts have an electron transfer chain that collects solar energy. Although prokaryotes do not contain mitochondria or chloroplasts, prokaryotes have other types of energy-producing electron transfer chains in their plasma membranes that produce energy.

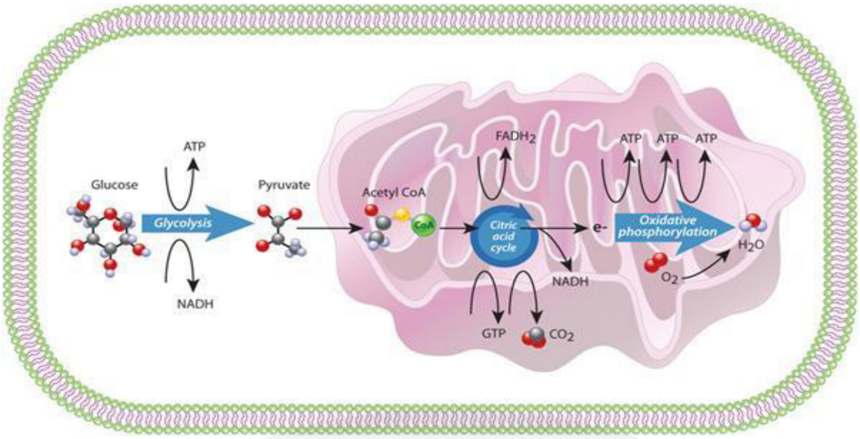

Figure 5. Metabolism in a eukaryotic cell: glycolysis, Krebs cycle (citric acid) and oxidative phosphorylation: Glycolysis takes place in the cytoplasm. The citric acid cycle occurs within the mitochondria and in its matrix and oxidative metabolism in the folded inner membrane of the mitochondria (cristae).

ATP production process in the inner mitochondrial membrane:

Mitochondria contain two main membranes. The outer membrane of the mitochondria completely surrounds the inner membrane and there is a small space between the membranes. The outer membrane has many protein pores that are large enough for ions and molecules the size of a small protein to pass through. In contrast, just like the plasma membrane, an inner membrane cell has much more permeability. The inner membrane is filled with proteins that are involved in electron transfer and ATP synthesis. This membrane surrounds the mitochondrial matrix, where the citric acid cycle produces electrons that move from one protein complex to the next protein complex in the inner membrane. At the end of this electron transfer chain, the final electron receptor is oxygen, which ultimately forms the water molecule.

Proton motive force (PMF): During electron transfer, protein complexes of the inner mitochondrial membrane transfer protons from the mitochondrial matrix to the intermembrane space. This process is repeated until the electrons released from the electron carriers (NADH and FADH2) lose all their energy as they move through the electron transfer chain and reduce oxygen during conversion to the water molecule. This transfer creates a concentration gradient, or proton motivation force (PMF), which uses the chemical and electrical potential and protein complex ATP synthase that it uses to synthesize ATP (Bcher1965 & Scholz).

Chemical potential:

$$\Delta G_{\Delta pH} = \Delta\mu_{\Delta pH} = RT \ln (C_{IN} / C_{OUT}) = 2.3\ RT\ \Delta pH$$

Where R is the general constant of gases and T is the temperature in Kelvin. ΔpH is the unequal distribution of protons that causes the pH in the space between the two membranes (outside) to be lower than the matrix (inside). The concentration gradient is the source of potential energy; Equilibrium occurs when balanced gradients and equal concentrations are formed on both sides of the membrane.

Electric potentioal:

$$\Delta G = -zF\ \Delta\Psi$$

Because the proton is a charged particle, the outside of the membrane (outside) has a more positive charge and the inside (inside) is more negative, and the difference is also called ΔΨ and sometimes ΔE. z is the particle charge, which is +1 for proton. Based on this, the free energy of the proton ΔGPMF or the driving force of the proton is defined as the sum of the two mentioned potentials:

$$PMF = \Delta\Psi + 2.3\,(RT/F)\,\Delta pH$$

$$\Delta G_{PMF} = 2.3RT\Delta pH + F\,\Delta\Psi$$

$$\Delta G_{PMF} = F \times PMF$$

The PMF in mitochondria is about 0.205 volts and the Faraday constant is 96.5 $kJmol^{-1}\,V^{-1}$. About 70% of PMF in mitochondria is due to ΔΨ and a smaller share belongs to ΔpH; The free energy of transfer of each proton to produce ATP in the synthase enzyme is calculated as follows:

$$\Delta G_{PMF} = F \times PMF \qquad \Delta G_{PMF} \sim -19.8\ kJmol^{-1}$$

On the other hand, in the standard condition free energy of ATP production is (Pänke & Rumberg 1997):

$$ADP + Pi \rightarrow ATP \qquad \Delta G^{0} = 31.1\ kJmol^{-1}$$

Table 1 shows the overall reaction of glucose oxidation and all major micro reactions involved in the ATP production process in biological systems and related thermodynamic parameters based on the experimental studies (Manchester 1980; Burton & Krebs 1953; Krebs et al., 1953).

Table 1. Reactions related to ATP production processes according to biological mechanism in living cells and related thermodynamic parameters

Reaction name		Chemical Reaction	ΔG1/ $kJmol^{-1}$	ΔH/ $kJmol^{-1}$	ΔS/ $JK^{-1}.mol^{-1}$
Glucose oxidation (Summary of total reactions)		$C_6H_{12}O_6(aq) + 6O_2(g) \rightarrow 6CO_2(g) + 6H_2O(l)$	–28702	+2880	+19286
Glycolysis reactions[3]		Glc+ATP→Glc-6-P+ADP	-17	-	-
		Glc-6-P↔Fru-6-P	+2		
		Fru-6-P→ Fru-1,6-P	-14		
		Fru-1,6-P→GA3P+DHAP	+24		
		DHAP→ GA3P	+8		
		GA3P →1,3-BPG	+6		
		1,3-BPG→3PG	-19		
		3PG→2PG	+4		
		2PG→PEP	+2		
		PEP→pyruvate	-32		
Krebs cycle[3]		pyruvate→acetate	-50	-	-
		acetate + oxaloacetate→citrate	-2		
		Citrate ↔isocitrate	+6		
		Isocitrate → α-ketoglutarate	-8		
		α-ketoglutarate → succinyl CoA→ succinate	-64		
		Succinate → fumarate	+84		
		Fumarate → malate	-4		
		Malate → oxaloacetate	+68		
Electron transport chain	NADH oxidation-water formation	$(NADH + H^+ + ½\,O_2 \rightarrow NAD^+ + H_2O)$	-259	-257	+9
	FADH2 oxidation-water formation	$FADH_2 + ½\,O_2 \rightarrow FAD + H_2O$	-278	-226	+172
ATP synthase	ATP production	ADP + Pi → ATP	+31.3	+28.1	-10.7

According to a study (Klingenberg & Pfaff 1966), the amount of oxidation energy per NADH is sufficient to produce 10 protons with a total energy of (198⁄259) kJ per mole, which leads to an oxidation efficiency of about 76% (198⁄259). Also, the oxidation energy of each FADH2 is sufficient to produce 6 protons with a total energy of about 119 kJ/mol, with an oxidation efficiency of 43% (119⁄278). According to experimental studies, the transfer of three protons leads to the formation of an ATP molecule. This means that the yield efficiency of ATP synthase protein is about 53% (31.3⁄59.4).

Calculations related to changes in heat content and pH in this study

The formula for calculating the amount of heat released in the environment and the resulting temperature changes was based on the following formula:

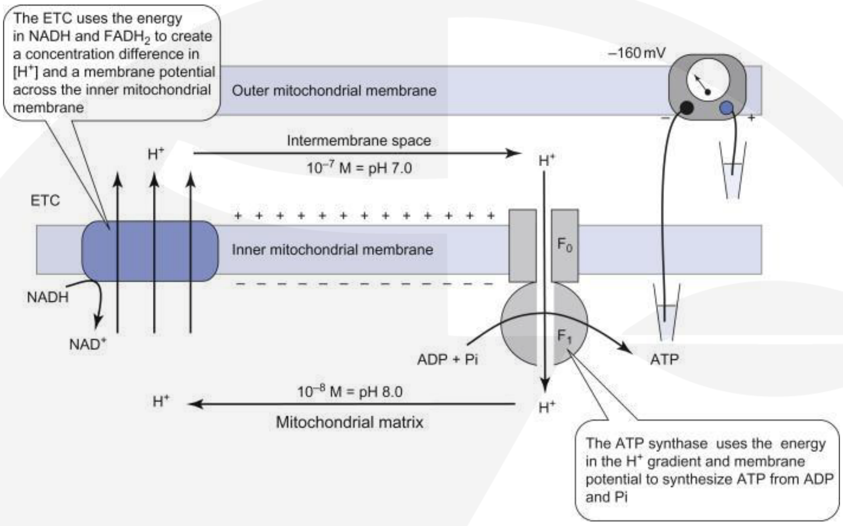

Figure 6. In the inner mitochondrial membrane, a high-energy electron is passed along an electron transfer chain. The released energy pumps hydrogen out of the matrix space. Using the generated hydrogen gradient energy, ATP synthesizes ATP synthase from a combination of ADP and Pi.

$$Q = m.C.\Delta T$$

Q in this study, the difference between the amount of energy released per transfer of each of the 3 H^+ ions from the mitochondrial intermembrane space into the matrix and the amount of energy stored per ATP molecule was calculated. The reason for choosing a 3:1 stoichiometry for H^+::ATP was that this ratio was obtained for the thermodynamic values reported under the standard conditions of ATP production and used in this study.

m and C are the specific mass and heat capacity of the energy delivery environment, respectively, which are taken into account in water biological systems, and based on this, temperature changes are calculated for the energy released in the mitochondria. It should be noted that since the study is performed at constant pressure, the heat exchanged is equal to the enthalpy of the reaction changes:

$$Q_p = \Delta H$$

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Introduction to Biological Dark Energy: Experimental Evidence of Information Transfer under the Influence of Taheri Consciousness Fields and Investigating the Effects of the Fields on the Properties/Behavior of Water and a Biological Cell

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Abstract

The effects of Taheri Consciousness Fields (TCFs) on living organisms and non-living materials have been investigated. Since there is no physical intervention in applying TCFs, the findings suggested that the information transmitted from the Cosmic Consciousness Network is crucial in affecting the objects under the study. The authors performed two experimental studies prior to this research. In the first experiment, the pH of pure water decreased significantly under the influence of TCFs. In the second experiment, the effect of TCFs on the Adenosine Triphosphate (ATP) production in the human HEK 293 cell line was investigated. It was found that the treated cells were able to generate a much greater amount of ATP compared to the control. This energy was released within a short period of TCF treatment (one hour) without sufficient glucose as the predominant fuel for cells. This study discusses the effects of TCFs by calculating the amount of information exchanged in the previous two experiments. According to Taheri, receiving information from TCFs requires a mental body. In other words, the behavior of water, and the human cell line alters under the influence of these fields because of receiving information through their mental bodys. Moreover, the shortage of time and resources to produce ATP in the TCFs treated cell strongly suggests that regardless of biological pathways, there is an alternative way to increase ATP in the immediate time, which is associated with an increase in information and a decrease in entropy of the system. This kind of energy is introduced and named "Biological Dark Energy" by Taheri.

Keywords: Information; Entropy; Taheri Consciousness Fields; Biological Dark Energy

Introduction

Nowadays, we are encountering several theories describing the nature of *consciousness*. Indeed, consciousness has been the subject of extensive investigations in various scientific fields, ranging from philosophy and cognitive science to neuroscience, biology, and physics. For example, the 'Orch OR' theory (Hameroff, 2021), the Higher-order theory of consciousness (Brown et al., 2019) and the Integrated Information Theory (Seth and Bayne, 2022). Even some scientists, such as the cosmologist Max Tegmark, introduce consciousness as *a new state of matter* (Tegmark, 2015). Moreover, the relationship between energy, matter, information, and consciousness is one of the most important topics for researchers. For example, Integral Relativity, an extension of General and Special Relativity, states that energy is the action potential and kinesis of awareness. In other words, one of its tenets is nothing, but the equation of awareness with energy and extends the law of conservation of energy to the conservation of awareness. So, awareness and energy are two sides of the same coin where the coin is considered *information*. This theory predicts that energy with super-positioned awareness is Negentropic (Neale, 2018).

One of the first models of information theory is the communication model introduced by Shannon and Weaver (Shannon, 1948). They defined communication *as all the procedures by which one mind may affect another*. Their communication model includes an information source, signal transmitter, signal receiver, information receiver/destination, and noise source (Figure 1).

According to Taheri's theory of T-Consciousness Fields (TCFs) with a history of 40 years, existence was initiated from a third primary component in addition to matter and energy, called T-Consciousness, which mediates the information of its transformation into matter and energy (Figure 2-a). In fact, in this relationship, matter, energy, and T-Consciousness have a common denominator called information (Figure 2-b).

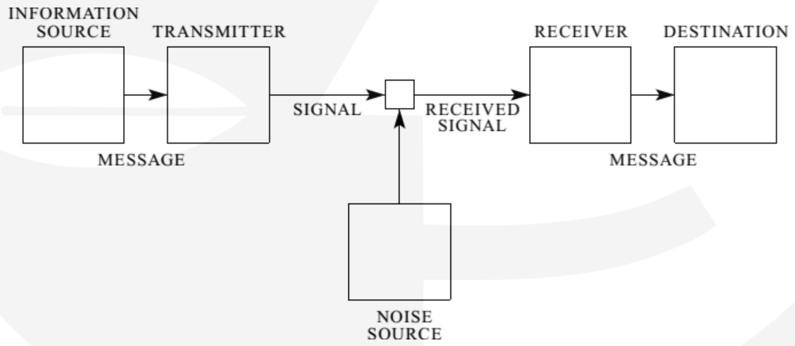

Figure 1- Schematic diagram of a communication system (Shannon, 1948, p.2).

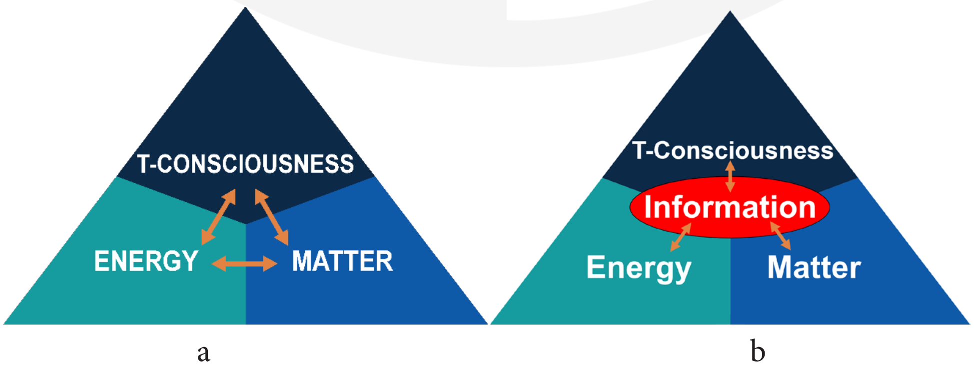

Figure 2: (a) The relationship between T-Consciousness, matter, and energy, (b) the relationship between information, T-Consciousness, matter, and energy.

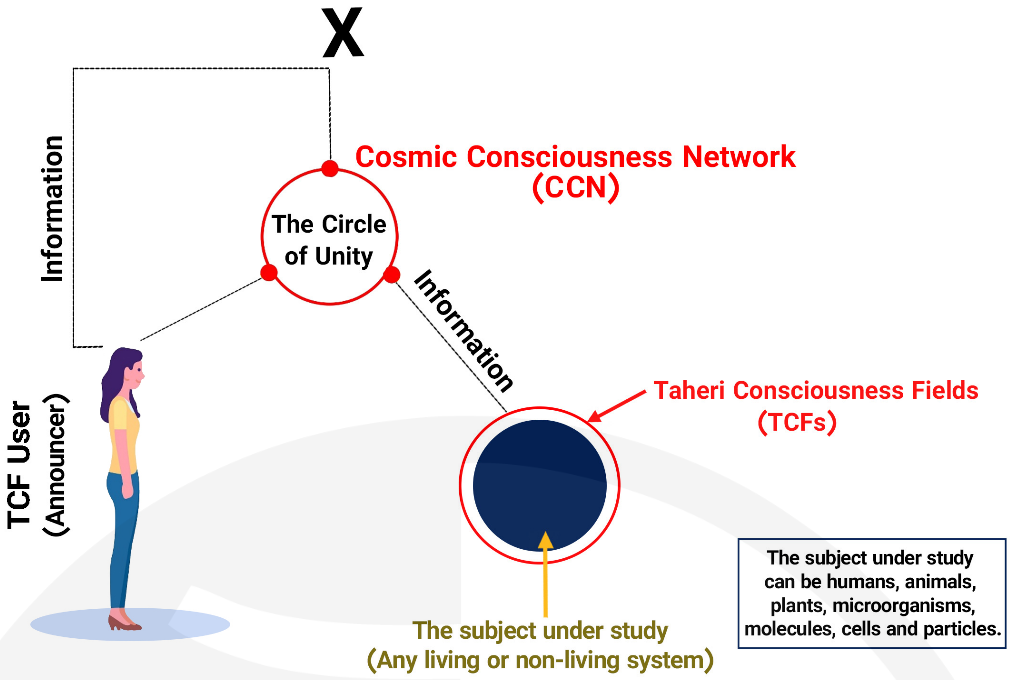

Figure 3: Schematic Image of Connection to the T-Consciousness Fields

Information is transferred to the object under study through TCFs, and the human mind plays the role of Initiator in this relationship (Figure 3).

Since *information* has a significant contribution to the theory of TCFs, the definition of *information* in the theory of information and the theory of TCFs will be examined further.

Theory of Information

Even though information and energy are interrelated, their relationship might not be obvious at the first glance. Maxwell was the first to realize the connection between these two 130 years ago and by proposing it, he challenged the second law of thermodynamics (Leff and Rex, 2003). He designed a thought experiment called Maxwell's demon, indicating that the second law of thermodynamics could be violated, considering that the total entropy decreases instead of increasing. The interesting point of Maxwell's demon thought experiment is that for such a process to occur, his demon must have information about the particles in the chamber (know the speed of the particles). In other words, obtaining information from the system reduces entropy. The higher the entropy of the system, the more information is required to fully understand the system. To reduce the uncertainty about the system and increase knowledge about it, it is necessary to reduce the entropy of the system.

Landau and Bennett further clarified the relationship between entropy (a kind of energy) and information to justify Maxwell's demon Paradox (Leff and Rex, 2003). They stated that in order for Maxwell's demon experiment to be implemented, it is necessary to store the measurement results in the demon's memory, and since its memory is limited, it must be cleared in the end so that it can perform new measurements. Thus, the way to relate energy to information was provided based on Landau's principle. This principle implies that whenever a bit of information is erased, some energy enters the environment and is wasted, which is at least equal to the following value:

$$1)\ E=k_B T\ln 2$$

where k_B is Boltzmann's constant and T is the ambient temperature. In this way, the entropy of the environment increases as much as $k_B \ln 2$.

Therefore, according to Landau's principle, energy consumption, and total entropy reduction in Maxwell's demon thought experiment are due to the erasure of the demon's information.

It should be noted that information is not directly related to physical quantities. In fact, information is neither matter nor energy, indeed matter and energy may be needed to transmit it. Therefore, the amount of information cannot be directly measured with a device or expressed based on physical quantities. The information content of a message is the amount of information obtained by understanding the values of the bits that make up the message. So, information is related to our ignorance about the message.

The second law of the rmodynamics and entropy, with two types of thermodynamic and statistical definitions, are used in different and sometimes incorrect concepts in scientific texts (Ben-Naim 2019). The use of the thermodynamic concept of entropy in explaining the definition of information in the system has been presented accurately and authentically by Shannon. In other words, in classical physics, the most valid relation demonstrating how much we do not know about the system is Shannon's entropy relation. Shannon quantified the relationship between entropy and lack of consciousness or information based on Leo Szilard's study on decreased entropy in thermodynamic systems (Szilard 1964). Shannon considered a bit as the unit of information. In other words, one bit is equal to the amount of information that a classical binary system can carry. Shannon showed that the weighted average of information hidden in the system based on the probability of occurrence of all possible events is equal to:

$$2)\ I = -K\sum_i P_i \ln(P_i)$$

where Pi is the probability of the ith event, and K is a positive constant that merely amounts to a choice of a unit of measure. Shannon called this average amount of information entropy. Hence, Shannon's relation became known as Shannon's entropy (Shannon, 1948).

In information theory, thermodynamic entropy can be interpreted as the missing knowledge required to specify the state of any system, that is, the microstates of that system. By comparing the Shannon entropy relationship with the thermodynamic entropy relationship, the identity of different parameters can be determined as follows:

$$3)\ S \equiv I$$

$$\ln\Omega \equiv \sum_i P_i \ln(P_i)$$

$$k \equiv K = \frac{bits}{\ln 2}$$

Therefore,

4)

$$1bit = 1.38\times10^{-23}\frac{joule}{Kelvin}\times\ln 2 = 0.95\times10^{-23}\ J/K$$

So, one joule/Kelvin can be written as:

$$5)\ 1\ J/K = 1.05\times10^{23}\,bits$$

And thus,

6)

$$1\frac{J}{K.mol} = \frac{1.05\times10^{23}\,bits}{6.02\times10^{23}\,molecule} = 0.174\frac{bits}{molecule}$$

The inverse relationship between entropy and information (I=-S) is one of the precise applications of entropy in biology, which is used from the level of a biological molecule to the whole genome and beyond it (Roach 2020).

TCFs and *information* in Taheri's approach

TCFs are newly discovered non-material and non-energetic fields with diverse functions and a subset of the Cosmic Internet Network. The main difference between the theory of TCFs and other theoretical concepts presented in regard to consciousness is the application and practical use of TCFs. These fields can be applied to all living and non-living organisms such as humans, plants, animals, microorganisms, materials, etc.

The definition of information in Taheri's theory of T-Consciousness Fields is different from its conventional definition in the world of science. In the conventional physical view, information is carried, moved, and replaced by matter and energy. On the other hand, based on Taheri's theory, *T-Information* is unknown in nature, and is carried, moved, and replaced by T-Consciousness. Accordingly, matter and energy do not carry information; rather, they become shifted (changed/transformed) by it. In other words, by applying any TCF, matter and energy become shifted (changed/transformed) into a form of basic and constructive information. To understand the difference between the nature of physical information and TI, examining the levels of information available on a website is exemplified here: while browsing a website, one has access to the front-end data (secondary information) and is not able to access the back-end data (behind-the-scenes/panel management or primary information). However, by having the admin password, one can access the back-end data, in which case, a higher level of information is accessed on this website that is not publicly available. In this example, the general front-end information of the website (secondary information) is equivalent to the physical information of the systems under study, and the back-end information of the website (primary information) is equivalent to the *T-Information*, according to Taheri's theory of TI. In fact, by using TCFs, not only the secondary physical information known in physics and inherent to matter and energy is influenced, but also by using any types of TCFs, the hidden primary information behind the scenes of matter and energy is also unveiled and used in line with the behavior of the system.

The influence of the TCFs begins with the Connection between CCN as the Whole Taheri Consciousness of the universe and the subjects of study as a part. This Connection called "Ettesal" is established by a Faradarmangar's mind (a certified and trained individual who has been entrusted with the TCFs). The human mind has an intermediary role (Announcer) which plays a part by a swift and brief attention to the subject of study and then the main achievement obtained as a result of the effects of the TCFs. These fields cannot be directly measured by science, but it is possible to investigate their effects on various subjects through reproducible laboratory experiments (Taheri 2013).

The research methodology in the study of T-Consciousness has been founded on the process of *Assumption, Argument, and Proof,* based on the following statements:

- The Assumption: The Cosmos was formed by a third element called T-Consciousness that is different from matter and energy.
- The Argument: The existence of TCFs can be demonstrated by their effects on matter and energy, e.g., humans, animals, plants, microorganisms, cells, materials, etc.
- The Proof is the scientific verification of the effects of TCFs on matter and energy (according to the Argument) through various reproducible scientific experiments.

Accordingly, to investigate and verify the existence, effects, and mechanisms of TCFs, the following five research phases (Phases 0 through 4), and the goals of each phase are outlined below.

Phase-0 studies aim to prove the existence of TCFs by observing their effects. The nature of T-Consciousness and what it is will not be addressed in this phase. Phase-1 explores the varied effects of different TCFs. Phase-2 examines the reason behind the varied effects of these fields. Phase-3 investigates the mechanism of TCFs effects on matter and energy. Finally, Phase-4 draws significant conclusions, particularly regarding the *mind and memory of matter* and their relation to the T-Consciousness, etc.

In the article on the mind of matter (Taheri et al., 2022a), focusing on the role and function of the mind without discussing what the mind is, it was shown that the occurrence of different properties/behavior of matter under the influence of TCFs indicates that matter, in addition to the physical body (material and energy constituent) requires a mental body. According to Taheri's theory of TCFs, the mind has different levels, including the basic (common) mind (the mind of matter, which is the common basis in the universe and includes the pure matter software program), the intrinsic mind (biological) (including the human mind, animal, plant, microorganism) and the perceptual mind (specific to humans, which provides the ability to ask questions, be aware of its own existence, and perceive concepts). The TCFs change the behavior of materials by changing the mental state in their mental body. The mental body of matter includes information (regarding each component of the system, the formation process, and all its equilibrium and non-equilibrium states) and mental states that occur during the process of formation of matter and has reached its current state (its equilibrium state). The function of the material mind is to maintain the information and mental states, interact with the TCFs, accept new mental states, and exhibit a behavior that corresponds to the new mental state. According to this model, the TCFs expose the subject's mental body to the selection of a new mental state upon the request of a Faradarmangar (Announcer). The mental body of the material, under the influence of the TCFs, accepts the presented mental state and is placed in that state. After that, properties/behaviors corresponding to the new state of mind provided by the TCFs appear in the material.

In this study, the following analyses are performed: (1) Investigation of the effect of TCFs on the pH of pure water, (2) examination of the changes in the amount of biological energy production of Adenosine Triphosphate (ATP), (3) conformity information theory to the phenomenon of the influence of TCFs on the properties/behavior of pure water and the amount of ATP production in the biologic cells, (4) analysis of the immediate energy observed in the living cell under the influence of the TCFs, and the introduction of '*biological dark energy*'.

Results and Discussion

Previously, the effects of TCFs on the pH of pure water (Current Issue, pp. 6-32), and biological energy production in a human cell line (Current Issue, pp. 33-54) were investigated. In the present study, by calculating the amount of information exchanged as a result of TCFs' effects with the goal of completing the previous research, the results are argued according to Taheri's theory.

Investigation of the effect of TCFs on the pH of pure water

Table 1 shows the amount of information exchanged via the pH change in the test samples of pure water under the influence of TCFs compared to the control samples. To explain the data in Table 1, an example is discussed: the loss of 16.5 kJ/mol of sharable energy of the test samples under the influence of TCF3 is equivalent to a total entropy decrease of 56.8 J/Kmol, and this means that the information exchange has been made as much as 10 bits/molecule in this situation.

Table 1- The amount of information exchanged via the pH change in the test samples of pure water under the influence of TCFs, compared to the control samples

	ΔG		ΔS		ΔI
	Calculated (kJ/mol)	Difference with Control (kJ/.mol)	Calculate d (J/K.mol)	Difference with Control (J/K.mol)	Difference with Control (bits/molecule)
Control	-36.26	-	124.5	-	-
TCF1	-33.02	3.2	113.1	11.4	2
TCF2	-27.60	8.7	94.6	29.9	5
TCF3	-19.79	16.5	67.7	56.8	10

The results of applying TCFs on the pH change of pure water demonstrated that the entropy and Gibbs free energy decreased under the influence of TCFs, while leading to small enthalpy change. The maximum difference between the enthalpies of the control and the samples under the influence of TCFs was 0.04 kJ/mol, which is much less than the amount of energy that is out of reach of the system distribution (more than 3 kJ/mol on the effect of TCF1 which is the lowest value among the samples). Therefore, the amount of differential energy does not appear as heat. According to Taheri's theory of the mind of matter, these changes in material behavior occur as a result of transferring information from TCFs towards the mind of material. According to this theory, the mental body of matter includes information on each component of the system, the process of formation and all its equilibrium and unbalanced states, and mental states that were formed during the process of formation of matter and its equilibrium state. The function of the mental body of matter is to maintain the information, to interact with the TCFs, to accept new mental states, and to exhibit behavior appropriate to the new mental state. To illustrate, by analyzing the amount of total entropy reduced in the pH change of the pure water test samples (for example, 56.8 J/K.mol under the influence of TCF3), it can be concluded that the unavailability of the sharable energy of samples under the TCFs treatments occurred as a result of interacting the mind of matter with TCFs (Taheri et al., 2022a). These results encouraged the authors to calculate the amount of information exchanged under the influence of TCFs.

By analyzing the amount of information exchanged in TCFs treated samples, it can be concluded that the amount of ignorance about the system has decreased based on information theory, for example, 10 bits/molecule under the influence of TCF3 treatment. In other words, the amount of information about the system has increased as a result of TCFs treatment. According to the results of this experiment, the released energy has not been converted into matter or heat, but into information. By this analysis, one can conclude that under the influence of the T-Consciousness Fields, the law of conservation of matter-energy is being replaced by the law of conservation of matter-energy-information. It is evident that more experiments are required in order to evaluate the effects of TCFs on the properties of materials and biological samples and gain sufficient evidence to prove this novel law and theory. It should be noted that the information theory does not answer the question of how or based on what mechanism the behavior of material changes towards the *announced* request or how the material interacts with the *announcer*. Moreover, this analysis does not answer the question of where the out-of-reach sharable energy has gone. Nevertheless, according to Taheri's theory of information, this energy can be converted into T-Information, as explained above.

Considering the theory of information along with Taheri's theory of information (Taheri, 2013), in addition to justifying the altered behavior of treated materials, it seems that the samples affected by TCFs have a kind of negentropic behavior.

Investigation of the effect of TCFs on the amount of ATP production in HEK-293 cell line

According to the results published in a previous study on the HEK-293 cell line, application of TCFs 1, 2, and 3 in less than one hour resulted in a respective 5, 11 and 7-fold increase in the number of ATP molecules of test samples compared to the control (Current Issue, pp. 33-54). Enhancing the rate of ATP production in biological pathways, not only requires sufficient time but also enough energy substrates. This experiment was conducted in one hour, and there were limited fuel cell resources. Therefore, this increase in ATP levels could not be due to the normal biological pathway of cytosolic and mitochondrial glucose oxidation.

Obtained results from Experiment 1, suggested that TCFs may maintain the proton gradient across the inner mitochondrial membrane through ionization of water molecules in the mitochondrial intermembrane space. Indeed, this alternative pathway occurred instead of the oxidation of NADH and FADH2 electron-carrying molecules in the electron transport chain. Table 2 shows the thermodynamic parameters of the general reaction of the natural biological pathway and the alternative pathway under the influence of TCFs to produce each ATP molecule.

Table 2. Comparison of the thermodynamic parameters of the alternative pathway of biological energy production (water ionization model) with the thermodynamic parameters of the general reaction and oxidation of the electron carriers of the conventional biological pathway; All parameters are normalized for the production of one ATP molecule.

Pathway	Reaction	Stoichiometry	ΔG*/ kJmol-1 per ATP	ΔH/ kJmol-1 per ATP	ΔS/ JK-1.mol-1 per ATP
Conventional Biological pathway	Glucose oxidation	1/32 Glc:1 ATP	–89.69	+90	+602
Alternative pathway under the influence of TCFs	Water ionization	3Water:1ATP	-239.7	-167.4	+242

Taheri's Theory of T-Consciousness Biology

According to Taheri's theory of the mind of matter (Taheri et al., 2022a), the selection of the alternative path to supply the concentration of H^+ needed to maintain the proton gradient across the inner mitochondrial membrane to increase ATP production can be attributed to the mental body. It should be noted that samples under the TCFs treatment were similar to the control in the aspect of vital functions. These observations led us to wonder how the mental body chooses the alternative path when the amount of free energy required for the formation of each ATP molecule is about 3 times that of the natural biological path (Table 2), and from where the required energy is supplied.

The theory of T-Consciousness Biology (TCB) is being introduced by Taheri in 2022. According to this theory, "life" is nothing but the emergence of T-Consciousness levels, such as the software component of information and memory (without memory, the existence of information is meaningless) to create and control the hardware component. This way, the Cosmos and all its components are alive, thus the emergence of T-Consciousness occurs in a gradual process. Moreover, life has different levels. For example, after preparing atoms and molecules, life on the earth began with the appearance of memory molecules by T-Consciousness programming, and after that, life-mimicking molecules reveal a higher level of T-Consciousness as the initial stage of life emergence. The highest level of life belongs to humans, which has made them understand the concept of "being" and can be aware of their existence.

As stated, the evolution of living organisms occurs in a gradual process, based on the theory of TCB. It includes the memory of matter, the consciousness of matter, life-mimicking molecules, and mental life, respectively. For example, a jellyfish (Scyphozoa) does not have a brain, heart, eyes, etc. therefore, they must operate by a mental life. After going through different stages and creating infrastructures, other life detectors become visible.

Biological Dark Energy

Life exists in two forms, light and dark. The energy used in light life is ATP with a constant production rate and cannot be generated in a large amount instantly. In other words, this immediate energy requires another system which is different from the biological reactions involving ATP synthesis, e.g., glycolysis, the citric acid cycle, and the electron transport chain. Therefore, to do some activities that require a huge amount of energy at once, there is an alternative energy that does not rely on metabolism and is invisible. This kind of immediate energy is nominated as "Biological Dark Energy" by Taheri. Dark life is related to software and non-physical components and does not implicate molecular structures to be revealed. Apparently, dark life has its own energy system. Therefore, the above experimental observations are shreds of evidence to confirm this theory. It can be stated that the energy required to advance the alternative path (ionization of water molecules between the two mitochondrial membranes) is the biological dark energy. However, it should be noted that the nature of *biological dark energy* is still unknown and requires further studies.

Using the data in Table 2, the Gibbs free energy difference between the two states, with and without the application of TCFs, is equal to 150 kJ/mol in standard conditions. Therefore, the difference in total entropy changes of the alternative pathway (water ionization reaction in the mitochondrial intermembrane space) in ATP production, compared to the usual biological pathway (glucose fuel and oxidation of electron carrier molecules: NADH and FADH2) is equal to:

$$7)\ \Delta S_{total} = \frac{-150000J/mol}{298.15K} = -503\frac{J}{K.mol}$$

Thus, in the production of ATP, the amount of total entropy decreases by 503 J/K.mol.

Knowing the molar amount of ATP produced per cell, the amount of entropy decreased per cell can be calculated.

Based on equations 6 and 7, the added information that occurred in the cellular system for each mole of ATP produced in the samples influenced by the TCFs can be calculated as

8) $\Delta I = 503 \times 0.174 = 87.5$ bits/molecule

Based on the number of ATP molecules made in the proposed alternative pathway in the samples influenced by TCFs during the last hour of the study (in which the TCFs treatment took place), the amount of normalized (to the amount of ATP produced in control) information exchanged in samples influenced by TCFs is shown in Table 3.

Table 3- The amount of normalized exchanged information (normalized to the amount of ATP produced in the control) in ATP production in samples influenced by TCFs in the last hour of the study

Sample	ΔMole of ATP (mol)	Normalized ΔMole of ATP	Normalized ΔI (bits/ATP)
TCF1	3.24E-06	4.43	390
TCF2	7.35E-06	10.05	885
TCF3	4.59E-06	6.28	553

According to the theory of information, the change of the material towards the *announced* request is equivalent to the fact that the level of ignorance about the system has decreased, or in other words, the amount of information about the system has increased. However, for the sample under the TCFs treatments to function as requested, it must receive 150 kJ more energy than the control for each mole of ATP production in standard conditions. Now, the question is: where did this amount of energy come from? According to the information theory, the exchange of each information package allocates certain entropy or a level of energy for the system. Therefore, it is possible that information has been converted into energy under the influence of TCFs.

It should be noted that the information calculations in this paper are based on the information theory and are only for the purpose of quantitative estimation of the increased information in the system under the influence of TCFs. Naturally, as mentioned in the introduction section, the information defined by scientists and the *T-Information* introduced in Taheri's theory of Consciousness Fields are different in nature, and these calculations do not mean that they are the same.

Conclusion

The authors performed two experimental studies prior to this research. In the first experiment, the pH of pure water decreased significantly under the influence of the TCFs. In the second experiment, the effect of TCFs on Adenosine Triphosphate (ATP) production in the human HEK 293 cell line was investigated. It was found that the treated cells were able to generate a much greater amount of ATP compared to the control. This energy was released within a short period of TCF treatment (one hour) without sufficient glucose as the predominant fuel for cells. This study discusses the effects of TCFs by calculating the amount of information exchanged in the previous two experiments.

The attempt to analyze the results of the previous two experiments based on information theory shows that this theory is not able to respond to the processes that occurred and does not have explanations for the following phenomena:

1. The interaction of the material with the announcer and the way the material moves towards the announced request

2. Providing the necessary energy to advance the alternative path (here: ionization of water molecules between the two mitochondrial membranes) for the natural biological path (glucose fuel and oxidation of NADH and $FADH_2$ electron-carrying molecules).

However, based on the available experimental data and the analyses carried out, the application of TCFs on non-living materials and living cells (biological samples) can be well explained by combining the conventional concept of information in today's world of science and the Taheri's theory of the mind of matter. Based on this combination, the following conclusions can be made:

- Knowing that according to information theory, the total entropy must be equal to the entropy of information, it can be predicted that since any interaction of matter with the announcer is equivalent to reducing ignorance of the system or increasing information, this interaction should lead to a negentropic phenomenon. In this way, the direction of movement of matter is determined after applying the TCFs.

- It seems that under the influence of TCFs, the law of conservation of matter-energy is affected and gives its place to the law of conservation of *matter-energy-information*. Further explanation of this category requires additional research.

- Applying TCFs to different samples of living materials and cells (biological samples), means the interaction of TCFs with the mental body of the desired samples and entering new information into the system under study. By establishing this interaction, based on the input information, a new mental state of the samples is activated. After that, the exchange of information between the mental body and the physical body of the samples takes place and leads to a change in the energy level of the system under study. As a result of this change in energy level and under the management of the mind of matter, a change in the properties/behavior of matter occurs.

- In the living system of this research, as a result of the information received from the TCFs, a type of energy different from the biological energy known in the cell is produced under the influence of the TCFs and provided to the living cell. According to Taheri's theory of T-Consciousness Biology, this type of immediate energy available to biological systems, which has a different mechanism and system for production, and its creation does not occur with the conventional pathways related to the routine metabolism of living cells, is called *Biological Dark Energy*.

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Experimental Investigation of T-Consciousness Information Transfer in Water Molecules & Living Cells and Introduction to Biological Dark Energy

The studies published in this issue are summarized along the following lines:

A. Experiment on water which comprises 70% of the weight of cells and living organisms. This study performed a comparison between changes in pH levels (one of the significant parameters among water molecules and atmospheric gasses, especially carbon dioxide) and changes in pure water temperature under the influence of T-Consciousness Fields with a control group under the same environmental conditions.

B. Study on the ATP production or the quanta of cellular energy exposed to the T-Consciousness Fields, with the aim of evaluating the changes in ATP levels in a short period of time. This study demonstrates the instantaneous effects of these fields on energy required for life.

C. The third paper aims to review and analyze the empirical observations in the above studies based on Taheri's theories, by discussing, the possible path for the instantaneous production of Biological Dark Energy in a cell, also presenting Taheri's view of information flow and the different mind levels.

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