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Review Article

Consideration for Initial Pulse of Germination

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ABSTRACT

The ultra-weak radiation from living cells has an influence on the cell renewal in tissue association. Here, the energy of electromagnetic wave from infrared range to UV-light plays a special role. The characteristics of the physical properties of water at the interface of hydrophilic surfaces, the so-called Exclusion Zones, indicate that an energy reserve is formed in this region. There is an energy input that results in an energy output in the direction of the biological material. These two observations the ultra-weak radiation from living cells and the physics of Exclusion Zones, lead to the conclusion that this is a physically energetic process that is formulated as a hypothesis to trigger germination.

Keywords: Germination; Ultra-weak radiation; Exclusion Zones

INTRODUCTION

The germination of all evolutionarily different plants can be attributed to a few factors: heat, water and light. Water and electromagnetic radiation are the key factors. According to the current state of knowledge, the physical properties of water on the surfaces of hydrophilic membranes are characterized by the fact that water in this area, known as Exclusion Zones (EZ), is a carrier of potential energy and is therefore also able to emit electromagnetic waves of light. This seems to be a mandatory requirement for germination.

DISCUSSION

The radiation of ultra-weak radiation from living cells, which was described by Gurwitsch at the beginning of the 20s of the 20th century, initially met with great international interest [1-4]. However, the only biologically reproducible traceability initially reduced general interest. Only the technological advancement like that of the secondary electron multiplayer technology improved the objectification of the radiation phenomenon. Research was resumed with great interest by various working groups, as well as by the working groups around Popp [5].

It is a fact that the ultra-weak radiation is reproducibly detectable with an intensity of 10-100 photons per square centimeter [6,7]. The spectrum of the radiation ranges from the infrared to the ultraviolet range of light [8]. The opinion emerged that the ultra-weak radiation controls the organ-specific cell renewal and the cell replacement in zones of damage. Viewed in this way, it is a communicative system in addition or in regulatory interaction with the known biochemically and hormonally controlling systems.

The ultra-weak radiation has a limited range and hardly exceeds more than a few cells in the tissue. It was therefore assumed that the detectable infrared radiation has the function of a carrier wave. With the help of this carrier function, UV rays are effective over a longer range. This could play a role in larger defects.

Gurwitsch's observation that seeds in the water germinate neighboring dry seeds germinating may be astonishing. Ultimately, the question of communication arises as a result of triggering by pulses. The answer to this question arises from the use of observation from water research.

Basically, it is necessary to fall back on the work of Pollack [9], who examined the physical properties of water and its structural change, such as the transition area of water to the hydrophilic membranes. The interfaces have an influence on the adjacent liquid and lead to a fundamental change in the physical properties. Basically, the physical chemistry of water is well known. Nevertheless, there are versions of ambiguity and various theses, of which those by Del Giudice [10] must be mentioned. Assuming larger clusters of water-water interaction,

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submicroscopic regions in water are postulated according to quantum field theory, which can absorb their structure's electromagnetic energy. Using this energy, the molecules can release electrons for further chemical reactions.

On the basis of the results, Pollack's experiments showed that the hydrophilic surfaces have an ordering influence on the adjacent water. The experiments with microsphere solutions showed microsphere free zones, which are referred to as Exclusion Zones (EZ). Pollack expanded and limited the importance of this EZ to areas of the hydrophilic membranes. These results led to the conclusion of a basic ordering of water, just as there is an ordering process in the cell water for physiological processes. Water molecules show a hexagonal structure on different surfaces. In the EZ, the hexagonal structures are arranged spirally. Changing the system, leaving the neutrality of dipole neutrality in favor of hexagonal structures, enables the absorption of light.

The physical meaning of the EZ shows the light absorption compared to the residual or bulk water with a maximum in the infrared, which also shows the energy output in the direction of the electromagnetic radiation range. But the light absorption, which extends over the entire range of the spectrum from the infrared to the UV spectrum, leads to an energy input, and one must assume that this also corresponds to the energy output in the direction of biological matter. The physical differentiation of EZ water and bulk water is clear. The light absorption behavior differs to the same extent.

In the field of development cooperation on hydrophilic surfaces, there is a concentrated electrical change and this shows the carrier of the potential energy of the system, a system that has to be connected with the energy input and output. One can assume that these changing conditions drive biological processes. The energetic processes of this kind are dynamic, and also dynamic in connection with the visible light and the adjacent frequencies. One thing is certain, water is an energy reservoir and the laws of physics are the basis of the regulation.

These factors inevitably lead to the question of a comparability of the effect of ultra-weak cell radiation and the energy output of development cooperation with regard to regeneration processes and germination. Both processes, germination as a result of the ultra-weak cell radiation and the energy input from the EZ, appear to be linked to ultraviolet and infrared electromagnetic radiation as the supporting systems. This raises the question of a hypothesis. Is the process of germination by radiation basically seen as a trigger?

The ripening of a seed is associated with the reduction of its water, the desiccation that ends the ripening. This leads to a diversification of the water when it falls below 20% of the volume. The water changes into a glass-like state. The phase of vertification reduces the water content to 5-10 percent by weight. In this state, the water molecules are bound to other molecules of the biological material via hydrogen bonds and lose their ability to act as solvents. The metabolic activity decreases. There is a state of rest with structural changes [8]. This morphological dynamic is well known, but the mechanisms are not fully understood. Here the focus should be on the physical characteristics of water. The conditions for germination can be determined with a suitable temperature, oxygen and water supply that cause swelling to compensate for deficits, hydraulic growth as Lockhart describes, and growth. But these steps seem to be the secondary steps in the whole process.

The verification is associated with a compression of the water by changing the hydrogen bonds. It must therefore be assumed that if the seed remains at rest, the change in hydrogen bonding is subject to an energy change in the binding capacity. The asymmetrical arrangement of the water molecule enables the formation of various forms of structural structure, which are associated with changing physical properties [9]. The hydrogen bonds play the basis and thus also in the property changes in the phase of the verification. The two functional groups, which are bound to a hydrogen atom by an electronegative atom, lead to a structural transformation within the water and to bonds of reactive groups of large molecules. From an energy point of view, the hydrogen bond is in the middle range around 20 kJ/mol. The hydrogen bond in the geometrical of water can be seen as a proton transfer Oxonium ions, comparable to EZ processes, could play a role in the basis of stability. Chemically speaking, a link between an oxonium ion and a water component forms a dimer with a strong bond. Hydrogen bonds in water can be found in two types of structural structure, linear and non-linear. As a result, it can lead to planned networking or tetrahedral structures. The property of the hydrogen bonds can be seen in the fact that they can open and close through thermal energy. It is a process that is currently being clarified after a structural one after the Debye relaxation. The relaxation observed in dielectric measurements is attributed to the hydrogen bridge network, which also leads to the glassy state when the water in the ripe seed transitions and could be the cause.

Back to the status of water in the ripe seed, the binding forces seem to come to a short- range order of the water molecules in an isotonic amorphous state, explainable considering the van de Waals forces. The reversal of the water structure and the associated change in the properties of the water can only take place through the supply of energy and thus through an increase in enthalpy. This is associated with a change in the energetic dominance between the forces of the hydrogen bonds and the van de Waals forces. The breakdown of electrostatic forces must lead the excessively strong hydrogen bonds in this short range back to the state of "liquid" water. Only then can swelling take place as an osmotic process, since the newly created diffusion gradient between the inside of the seeds and the surrounding water makes this possible.

As a result, it can be assumed that the energy input from EZ in turn introduces energy. That is, photons transfer their energy to electrons according to the law that photons transfer their energy or a part of it to electrons when they hit electrons. The energy of the photons is proportional to the frequency as well as the kinetic energy of the electrons. In this one can also conclusively presume the frequency dependence of the germination process.

The physical meaning of the cell's own radiation and the radiation character of development cooperation seem to be comparable. The germination by water application with the energy input can be explained by the influence of the water by

the hydrophilic surface of the seeds as well as the influence of ultra-weak emissions from living cells on others. One can postulate that UV light plays a special role, since UV light is highly energetic compared to the rest of the light radiation. However, this view requires further scientific research. It is a fact that the understanding of quantum mechanics describes the importance of the energy status of the cell and its regulations in a more differentiated way than the molecular material view of biochemistry allows. The energy regulates matter. And that's not a bon mot. All biological systems - plants or animal highly differentiated systems - work on the basis of a constant energy transfer. The process of cellular nature, the metabolic processes as such or photosynthesis show the fundamental importance of energy as a primacy by biochemical processes. In the spirit of this consideration, the hypothesis presented may appear simple. The supply of energy in the form of electromagnetic radiation to the structure-related hibernation state of the seed is to be seen as the primary process, quasi as an impulse, and is to be seen as logical.

CONCLUSION

The energetic flow and its interdependencies are the primary prerequisites for biological processes. This hypothesis is intended to provide an approach to scientifically follow the process of germination on the basis of physical conditions. The structural physical properties of water obviously have a great importance in the process of germination. The change in the structure of the water plays a central role in ripening as well as in germination. One can assume that this structural change is primarily possible only through energetic reactions.

Like everything else, biological matter is subject to physical forces. Biological systems have developed under this influence. This evolutionary development is associated with an adaptation; an adaptation that resonates between physical influence and the biological structure under which the functional processes of this structure have developed. However, this requires the diversity of the individual reactions. Beyond resonance, the physical influences lead to toxic or destructive reactions. This means that ultra-weak cell radiation can be understood as a reaction factor between biological systems.

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