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Hydrogen Subatoms and Photosynthesis in Certain Plants

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Abstract

Weak ultraviolet radiation of wavelengths in the region of 206 nm is empirically observed for certain houseplants during exposure to natural light. This radiation is linked to the passage of free electrons and protons to the subatomic states of hydrogen. Hydrogen subatoms help explain the results of a number of cold nuclear transmutation experiments for both mechanical and biological systems.

Keywords: hydrogen subatoms, houseplants, photosynthesis, characteristic ultraviolet radiation.

Hydrogen subatoms are special hydrogen atoms in their base state, notable for a more compact localization that allows them to approach the nuclei of other elements to significantly closer distances, thereby increasing the probability of nuclear reaction by several orders of magnitude [1]. Such states occur together with the traditional hydrogen-atom states, if taking into account the intrinsic quantum energy of the movement of an electron as given by de Broglie's equation:

$$E = \hbar\omega = m_0 \cdot c^2 \tag{1}$$

Let us denote by r_{0i} the threshold radius between the subatom and the nucleus, past which the former ionizes in the outer electric field of the ion:

$$r_{0i} = \frac{9Za}{2(1+Z)^2} \tag{2}$$

Here, Z denotes the atomic number, as given in the periodic table of elements, and $a = \hbar^2 / m e^2$ denotes the Bohr radius. As an example, titanium has $r_{0i} = a / 5.34$. In this case, the polarizability of the subatoms will be two orders of magnitude lower than the standard value for hydrogen atoms. Delivering a proton in an electron shell at such distances to nuclei of, let's say, nickel ($Z = 28$) is equivalent in energy to that of a projectile proton of approximately 5keV, and should increase the probability of nuclear reaction considerably [2].

In our opinion, the results from the many years of experiments aimed at the realization of controllable nuclear fusion of isotopes in growing microbiological cultures deserve close attention and a consistent explanation [3]. A number of such explanations exists. Specifically, the authors of the monograph of [3] have proposed a model based on the particular nature of barrierless nuclear reactions in non-stationary nuclear systems. This model describes the quantum movement of two uncharged particles in a parabolic cavity, formed by the external environment, with a discrete quantum spectrum. However, the particles are later assumed to be charged in the Born approximation for Coulomb particles that is used in computing the scattering cross section. This contradiction may be removed if we consider the movement of two charged nuclei in a hydrogen-subatom field. In this case, a significant convergence of these nuclei becomes possible, which may increase the probability of nuclear reaction under average room temperatures [4].

The Coulomb repulsion energy for nuclei at these distances is equivalent to the energy of the colliding nuclei:

$$\Delta E \leq \frac{2e^2 Z_1 Z_2 (1 + Z_1 + Z_2)^2}{9a(2Z_1 + 2Z_2 + Z_1 Z_2)} \tag{3}$$

As an example, for the case of the nuclei of magnesium ($_{12}$Mg) and oxygen ($_{8}$O) colliding in the neighborhood of a hydrogen subatom, we have $\Delta E \approx 1.9$keV, which should increase the probability of nuclear reaction significantly. Such reactions have been observed in biological cultures [3]. In collisions of this nature, the hydrogen subatom may act as an electron shield (a "catalyzer"), stimulating nuclear reactions and frequently taking part in them. In Equation (3), we see that the greater the charge of the nuclei, the smaller the distances to which they can approach one another, which is in agreement with the views of the authors of [3].

We venture to suppose that, in the context of plants, hydrogen subatoms must be generated during the photosynthesis process, as they are, in our opinion, indispensably vital to the plants' defenses and development – the production of the necessary elements through cold nuclear transmutation. For example, in biological systems it is possible to have "paired" reactions, where one of the nuclei collides directly with the hydrogen subatom, $^*H^1$:

$$K^{41} + {}^*H^1 = Ca^{42} + e + \Delta\varepsilon \tag{4}$$

Here, the energy release due to this reaction would be $\Delta\varepsilon = 9{,}96 * 10^3$keV. Reactions of this type have been observed experimentally and are described in [3].

Let us now write down the photosynthesis reaction with the explicit inclusion of the free electrons and protons that appear in the cellular structures, largely because of the dissociation of water and the restoring of the negative oxygen ions to a molecular state [5]:

$$6CO_2 + 8H_2O + \hbar\omega \rightarrow C_6H_{12}O_6 + 7O_2 + 4H^+ + 4e \quad (5)$$

Under stationary conditions where there is the stepwise recombination of free electrons and protons into hydrogen states, the passage into subatomic states is also possible, with the partial formation of hydrogen subatoms with the binding energy [1,2]:

$$\Delta\varepsilon = \frac{2e^2}{9a} = 6.02eV \quad (5)$$

In this case, there should be during photosynthesis a weak ultraviolet radiation with the characteristic wavelength of 206 nm.

The "money tree" (*Crassula ovata*), characterized by its thick leaves, the cactus (*Cleistocactus*) bush, and geranium (*Pelargonium*) were chosen as the houseplants to be used for empirical testing. The spectrometer employed was an FSD-10 v6.1 model from Optofiber, LLC (Russian: *Nauchno Tekhnicheskiy Tsentr Volokonno-Opticheskikh Ustroystv*). It had a 200-μm fiber optic cable, a wavelength-measurement precision of 2.25 nm, and a nominal sensitivity of 160 V/lx.s (for a wavelength of 550 nm). Each plant, together with the fiber optic sensor, was placed in black plastic boxing, which could be tightly sealed from the incident light. The intensity of the scattered natural-light radiation was regulated via the window blinds. The fiber optic sensor was placed approximately parallel to the window plane so as to avoid the daylight entering the sensor. An exposure time of 60 seconds was chosen for each spectrum so as to accumulate a weak signal. The optical spectrums were recorded seven times in wave neighborhoods ranging from 190 nm to 1080 nm, with signal-amplitude averaging done afterwards. It is worth noting that the plants were quite sensitive to the changes in the light they were subjected to. Consequently, LED irradiation had to be forgone, as it induced amplified radiation fluctuations in the plants. The relaxation of the light perturbations could continue for tens of minutes. So as to remove the effects of the different sources of noise, among them the spectral characteristics of the photoreception matrix, difference spectra were considered – a spectrum of a given intensive natural-light radiation was subtracted from a spectrum with a different radiation. Fig. 1 shows a difference radiation spectrum for the "money tree".

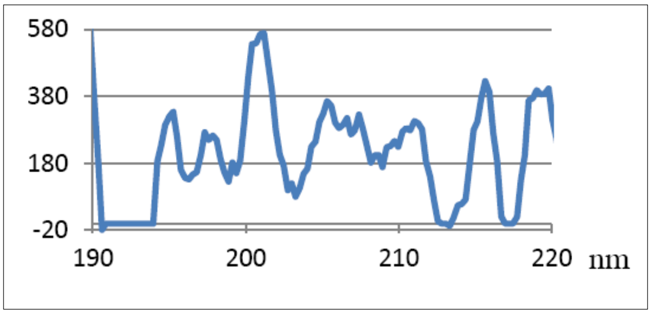

Figure 1: Difference spectrum between afternoon and morning radiation for the "money tree".

As expected, there is a radiation peak in the 206-nm wavelength region. There is an analogous situation with the cactus (Fig. 2).

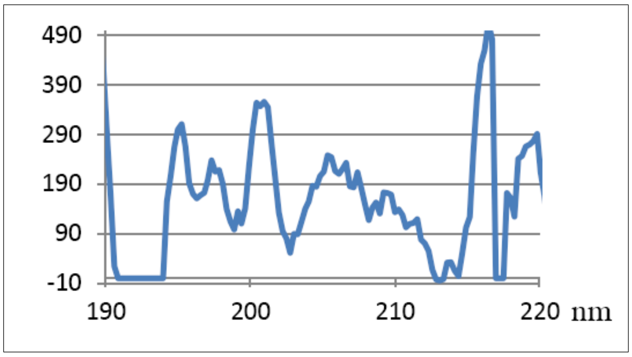

Figure 2: Cactus. Difference of the afternoon and morning radiation spectra.

While geranium leaves are significantly thicker than those of the money tree, photosynthesis in natural light nevertheless led to weak ultraviolet radiation in the 206-nm wavelength region (Fig. 3).

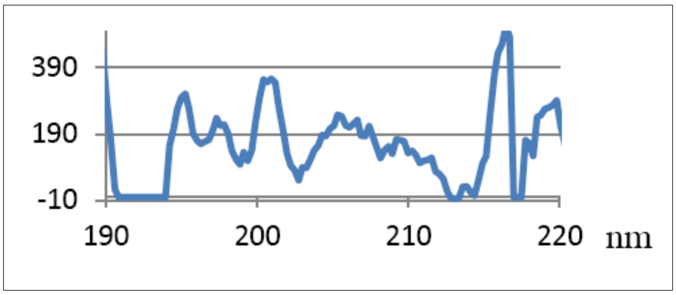

Figure 3: Geranium. Difference of afternoon and morning radiation spectra.

The contours of the spectra around 206 nm had approximately the same shape for all the plants studied. Could this have been an artifact of the spectrometer? So as to dispel such doubts, difference spectra between the natural-light radiation and the black wall of the plastic boxing were recorded. One of these spectra is given in Fig. 4.

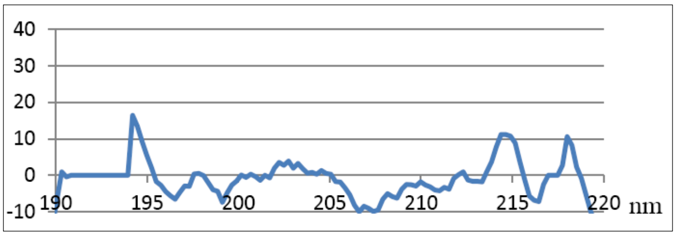

Figure 4: Difference spectrum between afternoon and morning radiation of the boxing wall.

It can be seen that, in the wavelength range between 200 nm and 215 nm, the fluctuation level does not surpass 10 nominal units, which is significantly smaller than the signal levels for this range for the plants studied.

In this manner, the radiation upon exposure to natural light that is present in the 206-nm wavelength region for the above-stated houseplants acts, in our opinion, as a possible confirmation of the hydrogen subatoms' existence.

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