Asesorías y Tutorías para la Investigación Científica en la Educación Puig-Salabarría S.C.
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RFC: ATI120618V12

Revista Dilemas Contemporáneos: Educación, Política y Valores.
http://www.dilemascontemporaneoseducacionpoliticayvalores.com/
Año: VI Número: Edición Especial Artículo no.:68 Período: Marzo, 2019.

TÍTULO: Subátomos de hidrógeno y fotosíntesis en plantas con un campo magnético.

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RESUMEN: La presencia de átomos de hidrógeno en sus estados subatómicos se puede predecir si se tiene en cuenta la energía intrínseca del movimiento cuántico de un electrón en un sistema protón-electrón. Por este motivo, se llevaron a cabo una serie de experimentos cuyo propósito fue probar la presencia de subátomos de hidrógeno. La formación de estados subatómicos de hidrógeno unidos se caracteriza por una radiación ultravioleta observable con una longitud de onda en la región de 206 nm. Dicha radiación se ha observado durante la fotosíntesis en ciertas plantas de interior. La presencia de un campo magnético débil se muestra para amplificar selectivamente esta radiación.

PALABRAS CLAVES: subátomos de hidrógeno, radiación ultravioleta, fotosíntesis, campo magnético.

TITLE: Hydrogen subatoms and photosynthesis in plants with a magnetic field.

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ABSTRACT: The presence of hydrogen atoms in their subatomic states may be predicted if one accounts for the intrinsic energy of quantum movement of an electron in a proton-electron system. For this reason, a series of experiments whose purpose was to prove the presence of hydrogen subatoms was carried out. The formation of bound subatomic states of hydrogen is characterized by an observable ultraviolet radiation with a wavelength in the 206-nm region. Such radiation has been observed during photosynthesis in certain houseplants. The presence of a weak magnetic field is shown to selectively amplify this radiation.

KEY WORDS: hydrogen subatoms, ultraviolet radiation, photosynthesis, magnetic field.

INTRODUCTION.

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 at room temperature (Nevolin, 2017). 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 5 keV, and should increase the probability of nuclear reaction considerably (Nevolin, 2017).

DEVELOPMENT.

In the contexts of plants, hydrogen subatoms should be generated during photosynthesis and are, in our opinion, indispensable to plant growth and defense – some elements necessary to plants may be produced by means of 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, ${}^{*}H^{1}$:

$$K^{41} + {}^{*}H^{1} = Ca^{42} + e + \Delta\varepsilon \tag{3}$$

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 (Guerrero, 2018).

In photosynthesis taking place under stationary conditions, electrons that are weakly attached to the walls of cellular structures may "capture" hydrogen ions (protons), potentially forming hydrogen subatoms with the binding energy (Nevolin, 2017):

$$\Delta\varepsilon = \frac{2e^{2}}{9a} = 6.02eV \tag{4}$$

During this process, we expect to observe an ultraviolet radiation with a characteristic wavelength of 206 nm or slightly greater (Nevolin, 2017).

It is known that magnetic fields have a significant influence on the growth and development of different types of plants (Novitsky and Novitskaya, 2016; Lobão and Pereira, 2016). Here, we consider applying a weak and constant magnetic field, which makes possible the onset of the spin splitting of the energy levels of weakly attached electrons, which in turn should lead to an increase in the density of the states and the intensity of the radiation. Indeed, the energy change in the electrons is equal to

$$\pm\frac{e\hbar H}{2mc}, \tag{5}$$

where H denotes the magnetic field intensity. When H = 0.1 T, the energy change is equal to ~10^{-5} eV, which essentially has no effect on the continuity of the energy spectrum.

In this manner, switching the magnetic field on and off makes it possible to obtain additional confirmation of the presence of hydrogen subatoms.

The “money tree” (*Crassula ovata*), characterized by its thick leaves, and geranium (*Pelargonium*) were chosen as the houseplants to be used for empirical testing. It has previously been shown that a radiation in the 206-nm wavelength region produced by these houseplants when exposed to daylight acts as one potential means to verify the presence of hydrogen sub atoms.

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 (Osman, 2016). The optical spectra were recorded seven times in wave neighborhoods ranging from 190 nm to 1080 nm, with signal-amplitude averaging done afterwards. 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.

A magnetic plate with a maximal intensity of 0.1 T was attached to a revolute arm and could be brought to just below the surface of the studied leaf. Fig. 1 provides the difference radiation spectrum for geranium in the wavelength range of 190-240 nm.

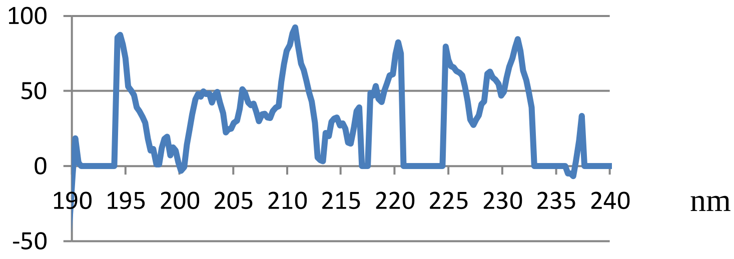

Fig. 1. Geranium. Difference radiation spectrum for the range of 190-240 nm.

Fig. 2 shows the difference radiation spectrum for geranium in a magnetic field.

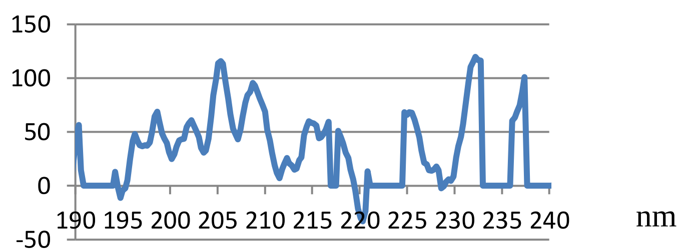

Fig. 2. Geranium. Difference radiation spectrum for geranium in a magnetic field.

On first glance, it may seem like any differences in the spectra with and without the magnetic field are negligible, if present at all. The issue lies in the fact that the intensity of the daylight radiation is non-stationary, increasing towards noon and lessening towards the evening. Furthermore, each experiment lasts at least two hours. For this reason, an additional (ratio-based) processing of the experimental data was also carried out. Fig. 3 shows the ratio of the radiation spectrum of the geranium leaf in the magnetic field to the spectrum of the leaf without the magnetic field. So as to avoid division by 0, all amplitude values are augmented by a constant of 0.01.

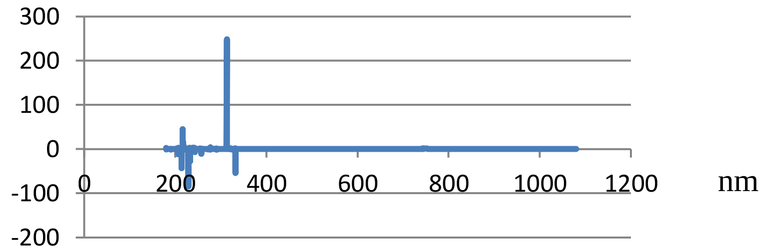

Fig. 3. Geranium. Ratio of the radiation spectrum with the magnetic field to the spectrum without.

As one can see from the figure, the greatest radiation is noted in the 200-nm region. Fig. 4 shows a more detailed view of the ratio of radiation spectra for the wavelength region of 190-240 nm.

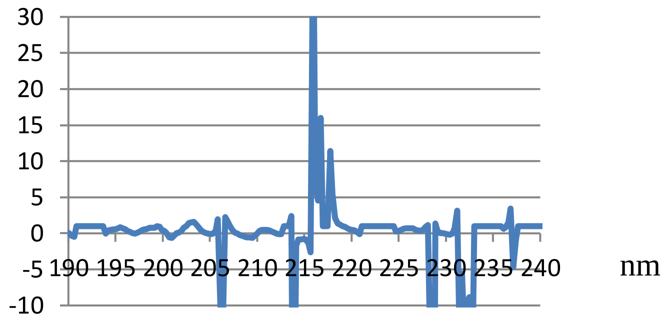

Fig. 4. Geranium. Ratio of radiation spectra for the range of 190-240 nm.

The results for the study of the radiation of the “money tree” in a magnetic field are analogous to the radiation spectra of geranium. Some differences are noted in the detailed view of the ratio of radiation spectra for the wavelength region of 190-240 nm. Fig. 5 shows the ratio of the radiation spectra for the “money tree” in the wavelength range of 190-240 nm.

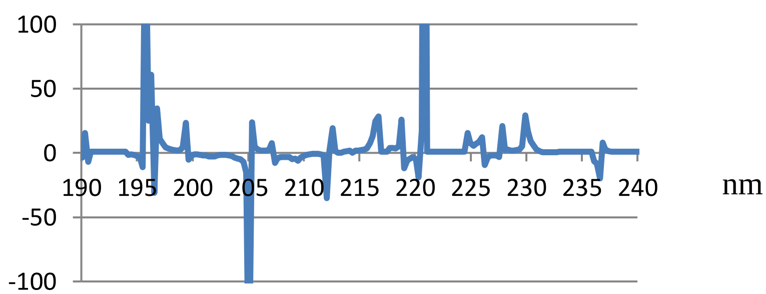

Fig. 5. “Money tree”. Ratio of the radiation spectrum with the magnetic field to the spectrum without.

While the detailed views of the spectra in Fig. 4 and Fig. 5 differ in peak order and amplitude, what's most important is that the radiation intensity for these houseplants notably increases in the 200-nm region in the presence of a magnetic field, which, in our opinion, confirms among other things the presence of hydrogen subatoms.

CONCLUSIONS.

This work was carried out with the financial assistance of the Ministry of Education and Science (Agreement 14.575.21.0125, dated September 26, 2017, identification code RFMEFI 57517 X0125).

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RECIBIDO: 9 de febrero del 2019. **APROBADO**: 22 de febrero del 2019.