

# Studying of Influence UVB Radiation on Plants by Methods of EPR-Radiospectroscopy and Mathematical Model

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We investigate influence of UV radiation on the photosynthetic apparatus of plants. At the moment relevance of this question is important. It is connected with recent changes in ecological conditions, touching irradiation of living organisms, the researches directed to find out mechanisms of damaging process of long-wave UV light development, being the important ecological component of solar radiation.

Influence UV irradiation on kinetic of photoinduced of electronic transport and paramagnetic properties isolated chloroplasts and leaves of higher plants is investigated.

On the basis of research it is shown kinetic photoinduced oxidation-reduction transformations of reaction center P700<sup>+</sup> in isolated chloroplast. UV light suppresses photochemical activity of photosystem 2 (FS2) and causes thus reduction of a stream electron between photosystems. Thus the photosystem 1 (FS1) is less sensitive to damage process UV irradiation. It is established, that in isolated chloroplast UV irradiation does not damage significant proton conductivity of thylakoid membranes. UV irradiation thylakoid membranes chloroplast is accompanied by increase in six-componential signal Mn<sup>2+</sup> and increase of an egress of hydrogen peroxide. The irradiation of leaves of higher plants with UV light activates outflow electrons on acceptor site FS1. Moderate doses UV of irradiation ( $1,2 \cdot 10^7$  erq/sm<sup>2</sup>) do not influence to the function of a electron - transport chain of between photosystems.

It is observed that in the darkness irradiated leaves and isolated chloroplast change the form of dark signal EPR 2, caused by accumulation of new stable radicals with  $g \sim 2,004$  is observed;  $\Delta H = 8$  Qs. It is shown, that UV light influences interaction of a electron-transport chain of chloroplasts with exogen electron carriers (2,5 - dichlorparabenzoquinone). It is shown, that under UV light signal EPR of semiquinone forms of exogenous organic quinone reversibly increases. Influence UV of an irradiation on molecules quinone in solutions is investigated. It is revealed, that at alkaline pH under the influence of UV light signal EPR quinone reversibly changes.

We have explained results of our experiments with the help of system of the differential equations that describes electronic transport in thylakoid membranes. This mathematical model adequately describes kinetics researched processes by method EPR radiospectroscopy.

On the basis of literary materials, experimental data and mathematical model offered the circuit of influence UV radiation on a light stage of photosynthesis at plants.