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THE STUDY OF THE BASIC TRANSPORT PATHWAYS FOR RADIONUCLIDE CESIUM - 137 INTO A PLANT ROOT SYSTEM.

One of the main radionuclide of the global fallout and Chernobyl incident radiocesiun (RC) are stored in the soil together with the other mineral nutration substances. That results in accumulation of the radionuclides in plants and finally in the people foods. The problem of reducing the radionuclides accumulation in plants may be solved only on the basis of knowledge what real mechanisms are responsible for the initial uptake and the following radionuclides redistibution on the plant organisms. The membrane systems transprting substances among the cells, tissues and environment play the key role in this prosseses , and they were under study in presented work.

Analysis of the results, obtained both with the help of the electrophysiological experiments on the separate cells and the data of the radionualides accumulation by the roots of a some agricultural plant seedlings, gave us possibility to release the main radionuclide pathways. The first is seleative way consisted of the ionic, mainly potassium channels in plasma cell membrane, the second is unselective one, called as "ionic leakage". The influence of apoplast on the characteristics of RC accumulation may take place too.

The goal of this work was to reveal the main RC accumulation mechanisms and to evaluate this share in the total accumulation by the roots. The time course of the RC activity growth in the roots barley seedling, grown in the Knoppe's solution, was studied.

Uptake of the RC was occured from lowsalt artificial soil solution (LASS): 10^{-4}M KCl + $2*10^{-4}$M CaCl + 10^{-3} M NaCl (1), LASS + $5*10^{-3}$ Ca + $5*10^{-3}$ Mg (2), LASS + $5*10^{-3}$ K + $5*10^{-3}$ Mg (3), LASS +$5*10^{-3}$ Ba + $5*10^{-3}$ Mg(4). The results shown, that the RC accumulation rate for tested variants were different ,, For example, the acamulation rate in LASS was nearly 1,5 as large as that for other solutions. Both mono- and divalent cations content increasing caused the same deceleration of activity accumulation. The rate of process was unchanged when the potassium channel blocker - barium - was added to experimental solution. Apoplast cation-exchange capasity reached maximum in LASS, and was halved by adding divalent cations (calcium and magnium, barium and magnium). Correlation between accumulation rate and apoplaste cation-exchange capasity, if we take into account the lack of barium effects and that for calcium-potassium exchange, suggest, that the unselective way RC uptake is the main for Knoppe grown seedling. In this case the total process rate is limited by apoplast.

The obtained results make possible to propose one of the direction of reducing the specific radionuclides accumulation by the plants without disturbing its mineral nutration: it is increasing the share of the selective pathway by means of both using special

agrochemical measures and choosing of the corresponding species of the agricultural plants.

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PROPERTIES OF THE HYDRATION WATER AS A STABILISING FACTOR OF THE DNA STRUCTURE.

A present humanity is faced with problem of extreme worsening of ecologioal situation.In oder to eliminate consequences caused by effect of the unfavourable factors to living organisms, it is necessary to know the mechanism of this effect.

A long time ago it is known it is water that is responsible for native structure formation of very important components of the organism - biomacromolecules, including the carrier of the genetic inrormation - DNA. Existance of various DNA conformations (A,B,C,Z), i.e. polymorphism,is formed also by water content of the DNA molecule on the whole. The unfavourable factors (radiation, chemical soiling etc.) can effect the DNA molecule directly, and also changing the hydration water propeties and consequently violating the DNA structure and functions.

The facts obtained by various methods show that DNA has several hydration shells. The complete hydration or Na-DNA double helix in the B-form occurs at about 20 bound water molecules per nucleotide that comes to the first hydration shell. The basic changes of the water characteristics are,within this shell. The numerical values of these characteristics (heat capasity, mean selfdiffusion coefficient and others) lie between the values for the bulk water and ones for ice.

In our investigations we measured the Na-DNA dehydration energies E1(energy of the hydration water evapouration) as a function of relative humidity (rh) (or n – number of water molecules per nucleotide) the measurings are carried out by differential scanning calorimetry method (DSC) under isothermal conditions using DSC-101 (Setaram) instrument. We used wet Na-DNA fibers at the various levels of rh. Excess dehydration energy $\Delta E_i(n)$isfound as difference between dehydration energy of sample E_i at given rh and mean water-water interaction energy in the liquid phase E_0. Using the excess energy values $\Delta E_i(n)$ we could have obtained information about dependence of dipol relaxation time of the water molecules τ_d (one of the parameters characterising the water molecules mobility) on the water content of the sample(n).

Other phisical parameter calculated from the obtained dependence $E_i(n)$ is free volume V_f occupied by the water molecules in the hydration shell. This parameter rerlects character of the binding molecular forces with absorbtion centre of the donor type or the