

**Phytosorption Method of Decontamination of Soils Polluted with Heavy Metals and Radionuclides**

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After the Chernobyl accident, the major territories were contaminated with radionuclides of cesium, strontium, plutonium, and also with some heavy metals (Pb, Cd). Thus the clearing of the major contaminated territories by usual engineering methods seems to be improbable or impossible. In this communication the results of study a possibility of application phytosorption method for remediation of the contaminated soils are presented. A number of soil additives including activated carbon, mineral adsorbents, its modified forms and composite materials were tested on their influence of  $^{137}\text{Cs}$  transition in plants (sunflower, rape, lupine, amaranthus, mustard, Jerusalem artichoke). The influence of sorbent type, its amount and degree of soil activity on the process of soil decontamination was studied. The field experiments were carried out on the  $^{137}\text{Cs}$  - contaminated soil, which has level radioactivity in the interval from 24 to 0.9 kBq/kg. The field investigations showed not ordinary role of sorbents in migration of radionuclides in complicated system soil-plant. It was shown that in the presence of mineral sorbent the accumulation of  $^{137}\text{Cs}$  by plant only a little bit exceeds the natural process of phytoextraction, while the use of composite carbonmineral sorbents essentially increase cesium concentration in plant green mass. Such effect was observed at the different activity of the soils. It was established that the additions of carbonmineral sorbents into the soil increases the growth of the shoots and the harvest as a whole. It is probably caused by presence in the sorbent matrix of some microelements, and also by the ability of the sorbents to remove from the soil the contamination of the herbicides and pesticides, which depress the growth and development of the plants. At the same time we can observed effect of decreasing migration of radionuclides in the plants and essential decreasing of vegetative mass in comparison with the control. This effect is observed at addition in the soils some sorbents and coplexons which can strong fix radionuclides. It means, that using linking function of sorbents or complexons towards radionuclides makes possible the producing of environmentally clean agricultural produce on the polluted soils. During the test of a number of radioaccumulating plants it was determined, that amaranthus is a plant with the highest potential for extraction  $^{137}\text{Cs}$  from the contaminated soils, at first, due to the natural high specific radioaccumulative ability ( $k_1=1.5-2.5$ ), secondly because of high productivity ( $k_2=2.5-3.5$ ). The introduction of sorbent increase both these properties ( $k_3=6-8$ ) of amaranthus, that makes possible the use of it for removal of cesium from the soil.