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COMPARATIVE CHARACTERISTICS OF ¹³⁷CS ACCUMULATION BY PLANT SPECIES OF HEATHER AND ROSE FAMILIES

As a result of the Chernobyl accident in 1986 the total radioactivity of the substances fallen out of the reactor into the environment is about 300 MCi. The most contaminated areas of Ukraine are Kiev and Zhytomyr regions. By 1996 forest soils with ¹³⁷Cs contamination density of more than 37 kBq / m² (1.0 Ci / km²) occupied more than 439,879 hectares in Zhytomyr region. 30 years after the Chernobyl accident radiation situation slightly changed, mainly due to the physical decay of radionuclides. But radiological problems in the region remain relevant.

As a result of the accident, strong penetration of radionuclides into various parts of forest ecosystem food chains occurred. Such species of rose and heather families as cowberry, blueberry, blackberry and raspberry occupy a special place in trophic chain among producers. These plants form living above-soil cover and undergrowth of forest ecosystems; besides, these forest berries are consumed by man.

Blueberry (*Vaccinium myrtillus* L.) is a deciduous bush up to 0.5 meters high. Cowberry (*V. vitis-idaea* L.) is a stunted evergreen bush. These species are the representatives of heather family (Ericaceae). They are growing under the canopy of forest trees forming a living above-soil cover. Blackberry (*Rubus idaeus*) and raspberry (*R. idaeus*) are bushes of about 3 m high. These plants are the representatives of rose family (Rosaceae) which grow in forests, clearings and riverbanks, thus they form undergrowth. Contamination of plants depends primarily on ¹³⁷Cs radiation contamination density of soil. Comparison analysis in the same research area in 1996 and in 2016 shows the decrease of this index by 2 times approximately. In 1996 the average value of ¹³⁷Cs radiation contamination density of soil was about 221 ± 57 kBq / m², and in 2016 - 116 ± 35 kBq / m². ¹³⁷Cs specific activity in cranberry shoots was 2739 ± 290 Bq / kg, blueberry shoots - 1310 ± 269 Bq / kg, blackberry shoots - 179 ± 16 Bq / kg and raspberry shoots - 9 ± 23 Bq / kg. The accumulation coefficients equaled to 23.61, 11.29, 1.54, 0.19 ((Bq / kg) / (kBq / m²)) respectively. The decrease of ¹³⁷Cs penetration from soil into phytomass was also observed when to compare with the results of 1996. The difference in values of accumulation coefficient for cranberry was by 4 times; for blueberry and blackberry the difference was by 11 times; and for raspberry it was by 300 times. Such considerable differences can not be explained only by physical decay of radionuclides. The main reason, in our opinion, is the vertical migration of isotopes through soil profile, which occurred as a result of changes of radioactive contamination of sucking roots zone of different plants species.

Therefore, based on current research data, we can conclude that the changes in the radiation situation occurred 30 years after the Chernobyl accident due to natural decay of ¹³⁷Cs radionuclides ($T_{1/2} = 30$ years) and vertical migration of radionuclides in soil.