DETERMINATION OF Cs-137 IN SOILS.

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To the most significant artificial radionuclides belongs Cs-137, with half-time of radioactive decay 30 years.

The most important source of Cs-137 are nuclear weapons testing and nuclear industry. Atmospheric dry and wet fallout are the main source for the global distribution of artificial and cosmic ray produced radionuclides in the lithosphere.

In the initial fallout, Cs-137 is present as cation or a simple compound. Chemistry of radionuclides in soils is strongly influenced by the large surface area of very fine particles and colloids, the latter with sizes of 1-450 nm. Clay minerals and polymeric organic substances are the most important constituents which interact with radionuclides in the soil solution.[1] Adsorption of radionuclides on clay minerals proceeds by electrostatic forces, surface complexation and ion exchange. 85 per cent of Cs-137 after the Chernobyl accident was found till 5 cm depth below surface. [2]

Ion exchange capacity, pH, redox conditions and complexation with humic substances determine speciation, behaviour and availability of radionuclides for the uptake by plants. 35 per cent of Cs-137 that was absorbed by leaves of plants, is transported to the root systems of plants within 300 hours. [3]

In cooperative with ÚKZÚZ in Brno contents of Cs-137 in soil in the Czech Republic will be measured. Results will be elaborated using GIS.

References: