Abstract

Plants are able to uptake radiocesium from soil, which is the potential route to enter the food chain.

Cesium mobility in soil is determined by clay particles. Cesium can be reversibly adsorbed on their surface or can be fixed between layers. Mineral illit has the highest selectivity for cesium due to its frayed edges. Organic matter determines cesium mobility only in soil with organic matter content above 90 %. Cesium is more available for plants in this soil.

Cesium uptake varies among species. Many plant species accumulating big amounts of cesium belong to family *Chenopodiaceae.* Cesium uptake is affected by other cations in soil solution. Potassium is the most effective one. Increasing of external potassium concentration from 50 μM to 250 μM decreased cesium uptake thirty-fold. Potassium affects cesium mobility in soil and plant uptake. Due to chemical similarities of cesium and potassium some potassium transporters efficiently transport both cations. Potassium transporters are therefore considered the main entrance site in plant roots. Great contribution to cesium uptake is dedicated to high-affinity potassium transporter HAK5. Another great part of cesium uptake is mediated by non-selective cation channels. Plants can uptake up to 80 % of cesium applied on shoot surface.

Cesium is highly mobile within plants, translocation via xylem and phloem is effective. Cesium distribution within plants corresponds with distribution of potassium, although it is not function of potassium distribution. Roots and leaves typically accumulate high amounts of cesium, while flowers and fruits usually contain negligible amount of cesium. If foliar uptake takes place, up to 20 % of cesium is translocated to fruits.

Cesium is toxic element because it competes for binding sites on important enzymes. Cesium significantly alters gene expression.

Key words: Cesium, soil, uptake, toxicity, potassium, accumulation.