Abstract

The review part of this bachelor thesis deals with sources of artificial radionuclides strontium-90 and caesium-137, which are released into the environment mainly due to nuclear weapons tests and nuclear accidents. The most extensive contamination of the Czech Republic was caused by the Chernobyl accident in 1986. The transport of strontium-90 and caesium-137 through the environment is summarised, with emphasis on soil. In the experimental part of the work, the residual contamination of arable and meadow soil with these radionuclides was evaluated in the Veltrusy locality in relation to hydropedological properties. This site was chosen in connection with the project "Innovative methods for the detection of ultra-low concentrations of radionuclides to assess the vulnerability of drinking water sources in the event of a nuclear accident", which was carried out within the T. G. Masaryk Water Research Institute. It was found that contamination varies depending on land use, such as cultivated and uncultivated land. Strontium-90 was not measurable at either site, whereas caesium-137 was detectable at both of them. Most of the caesium-137 in the grassland soil was measured in the near-surface layer of the soil, whereas in the arable soil it was evenly distributed throughout the profile. The mobility of caesium-137 through the soil profile is enhanced by the higher abundance of non-capillary pores and higher humus content. In contrast, immobility is caused by a higher content of the clay fraction. The capillary pores cause the penetration of caesium-137 through the root system into the plants and caesium-137 becomes part of the food chain. The groundwater at the site is not at risk.

Key words: contamination, soil, ^{90}Sr, ^{137}Cs