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## Radionuclides' uptake from contaminated soil into vegetables and consequent dose assessment

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Radioactive wastes with elevated natural radionuclides content, like wastes from uranium ore processing, can be deposited relatively close to agricultural areas. It is therefore important to understand the behavior and transport of those radionuclides in the environment. In support to this knowledge, a plant pot experiment was carried out, involving three different types of vegetables (radish, savoy and rocket) grown in substrates, contaminated with different amounts of added uranium mill tailings (UMT). The experiment involved plants grown in non-contaminated substrate and four soils with various amounts of added UMT content, representing various contamination scenarios. After five months of growing period the investigated plants were harvested, and activity concentrations of U-238, Th-230, Ra-226 and Pb-210 were determined in the substrates and all plant parts, such as shoot and root systems.

Based on measurement results, soil-to-plant transfer factors, expressed in terms of concentration ratios, were calculated. The results obtained indicated significant linear correlation between the content of radionuclides in soil and plants as well as between the content of the radionuclides in plants and soil parameters.

Finally, annual effective dose due to the radionuclides ingested by consuming the studied vegetables were calculated. Different scenarios with respect to consumption and activity concentrations were taken into account. The total annual effective ingestion dose and UMT content in soils showed highly significant linear correlation. However, the assessed dose was far below the world ingestion average dose, even if assuming that the activity concentrations of Po-210 and Pb-210 in the investigated samples were in equilibrium. Nevertheless, given the fact that the dose was correlated with the UMT content, caution should be taken when consuming vegetables grown in areas close to uranium ore processing sites.

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