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Investigating Po-210 and Pb-210 uptake from coal ash and slag by earthworm *Eisenia fetida*

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Natural radionuclides can be concentrated in coal ash and slag. When such a waste is deposited in the environment, it is normally inhabited by different animals and plants. Earthworms are one of the most exposed as they live in close contact with such a waste throughout their entire life. Po-210 and Pb-210 represent one of the most radiotoxic radionuclides, especially when ingested. Within this study we wanted to assess the uptake of Po-210 and Pb-210 by earthworm *Eisenia fetida* transplanted on the coal ash and slag sampled from the former chemical factory in Kaštela Bay (Croatia). Uptake was compared with cultivation on non-contaminated and reference soil. After cultivation period of 28 days, earthworm samples were cleaned. From one set of samples, which was used also for cytotoxic and genotoxic investigations, coelomic fluid was removed and from other not. They were dried at 65 °C. Then the samples were digested and Po was spontaneously deposited on Ag disc and Po-210 activity concentration was determined by alpha-particle spectrometry. Pb-210 was separated using Sr Resin column and measured by gas-flow proportional counter. Results show that Po-210 activity concentrations in earthworms cultivated on coal ash and slag were in the range of 43-93 Bq/kg, whereas on non-contaminated and reference soil values were in the range of 17-39 Bq/kg. Therefore, Po-210 activity concentrations found in earthworms cultivated on coal ash and slag are 2-3 times higher compared to control group. Similar observation was found for Pb-210 only for samples without coelomic fluid, where samples with coelomic fluid did not show any significant difference between those cultivated on coal ash and slag and control ones. This indicates different distribution of Pb-210 and Po-210 between coelomic fluid and other earthworm's body compartments.

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