MULTI-ELEMENT ANALYSES OF EARTHWORMS FOR RADIOECOLOGY AND ECOTOXICOLOGY

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Increasing concern about environmental radiation protection has raised awareness that more information is required on the transfer and accumulation of radionuclides in the biological compartments of ecosystems. ICRP (International Commission on Radiological Protection) selected earthworm as one of the reference organisms in their radiation protection recommendations. Earthworms play an important role in ecosystems, and might be a good indicator of soil contamination and its effect on the ecosystem. The elemental composition of earthworms gives useful information on background levels and possible accumulation of metals as well as related radionuclides. In addition, a change of the elemental composition itself might be a possible indicator of the effect on the earthworm and/or ecosystem. However, data for the elemental composition of earthworms are limited except for some specific heavy metals such as Cd, Zn, Pb and Cu. In this study, earthworms and their growth media were analyzed for more than 30 elements, including radionuclide related elements such as Cs, Sr, Th and U, in order to obtain the basic information on the transfer parameters of the elements. The earthworms analyzed were fed in the laboratory or collected in the environment. The concentrations and transfer factors of the elements were determined both for laboratory and natural conditions. The controlling factors on the transfer parameters such as the bioavailability of the elements in the soils will also be discussed.