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Evaluation of the teratogenicity and genotoxicity of uranium mine effluents and soil elutriates from Quinta do Bispo, Portugal

Sonia Mendo, Joana Lourenço, Sérgio Marques, Fernando Carvalho and **Ruth Pereira**
University of Aveiro, Portugal

Active and abandoned uranium mining sites represent complex environmental problems. Health risks and environmental effects may result from radon exhalation and dispersion of radioactive dust from the mine wastes. In addition, the discharge of contaminated mine water and spreading of sludge resulting from the treatment of the mine pit water, often containing high concentrations of toxic metals and radionuclides, has an associated risk. Chronic exposure to metals and radionuclides may result in continuous bioaccumulation and has been linked to several harmful effects (mutagenic, carcinogenic and teratogenic, among others) in living organisms. Therefore, the use of standard ecotoxicological tests to evaluate the effects of effluents and soil elutriates containing these elements, is highly relevant. Zebrafish is a model organism in aquatic ecotoxicology. Here, the Fish Embryo Toxicity (FET) test and the comet assay were used to determine the teratogenicity and genotoxicity of the mine pit water (non-treated and chemically treated) and of the sludge from decantation ponds from Quinta do Bispo, an abandoned uranium mine in the Centre of Portugal. Chemical analyses of all the samples tested (effluents and elutriates) revealed high concentration of metals and radionuclides. The FET test showed that the exposure of the embryos to low concentrations of the untreated mine effluent, significantly affected hatching success and normal development. Also, one of the tested elutriates, significantly affected the survival of embryos. Regarding genotoxicity, all the effluents tested showed a significant induction of DNA strand breaks in almost all the concentrations tested, after only 24h exposure.

Biography

Sonia Mendo obtained her PhD in Biology in 1998 by the University of Lisbon (Portugal). She is a Professor with Habilitation at the Biology Department of the University of Aveiro (UA), Portugal. She is the Coordinator of the Molecular Biotechnology Laboratory and Director of the Master Course in Microbiology at UA. She is author/co-author of 59 Wos papers. She was PI of 3 research projects funded by the Portuguese Foundation for Science and Technolgy (FCT) and participated in more than 14 projects as team member. She supervised more than 70 MSc thesis, 9 PhD students and 3 Post docs.

smendo@ua.pt

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