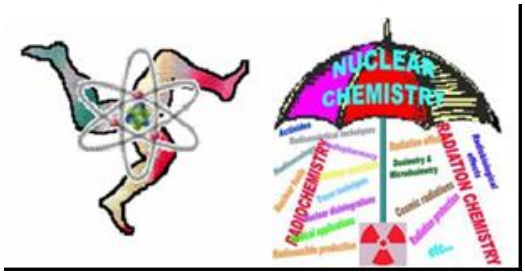

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Radioecology around a closed uranium mine

Tuesday 20 September 2011 09:10 (15 minutes)

Uranium mine at Žirovski vrh, Slovenia, operated from 1985 to 1990 and processed about 600,000 tons of uranium ore. The uranium mill tailings (UMT) were deposited onto the Boršt waste pile lying close to the mine, in the subalpine region with relatively high rainfall and within a relatively densely populated area.
The mining influential area has been under continuous radiological monitoring since starting industrial excavations in 1982. However, more detailed radioecology studies were initiated some six years ago. They are focused on assessing mobility and bioavailability of radionuclides present in the tailings pile.
The mobility of 238U, 234U, 230Th and 226Ra was studied by the Shultz modified Tessier sequential extraction procedure. The uranium isotopes were found to be the most mobile from the UMT, whilst the mobility of 226Ra and 230Th appeared to be suppressed by high sulphate concentrations.
When comparing the revised BCR and the modified Tessier sequential extraction protocols it was found that the protocols are not comparable as the data obtained are protocol- and element- dependent.
Uptake of particular radionuclides by the plants grown in the vicinity of the former mine were also investigated. In particular, a common reed grown in soils contaminated with the seepage waters from the tailings was studied. The plants contained elevated levels of 238U, 226Ra and 210Pb compared to the plants from control site.
Activity concentrations of natural radionuclides in milk collected from the area of Žirovski vrh were comparable to the reference location, except of uranium where the content was higher. The combined annual effective dose for adults consuming milk from the Žirovski vrh area is 13.0 ± 1.7 μSv/year.

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