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Environmental radioactivity study of forest ecosystems: long-term behaviour of contamination of wild boar and its radioecological coherences

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Content

Thirty years after the Chernobyl accident on 26th of April 1986 the consequences are still noticeable and remain an important topic in the media and for society.
Although the consumption of mushrooms and game from European (Austrian/Bavarian) forests is no longer dangerous, in most cases, Cs-137 and Sr-90 can still be significantly detected. Cs-137 mainly occurs in mushrooms and flesh of game, whereas Sr-90 can be found in bones of game. Although there are many interesting areas of a forest to investigate, this work focuses on examining the amount of Cs-137 found in wild boar muscle and Sr-90 in wild boar bones. For Sr-90 in wild boar there are very few studies because, on one hand, less Sr-90 was emitted into the environment in Europe during the Chernobyl accident than Cs-137 and, on the other hand, Sr-90 in bones is not eaten. However, as a so-called bioindicator, Sr-90 is still highly useful for radioecological studies. To understand the interactions between the different parts of the forest, samples of soil and plants were also taken and measured for Cs-137 and K-40.
Cs-137 and K-40 in flesh were investigated by low-level gamma-ray spectrometry. Due to the sample inhomogeneity, uncertainties of the measuring geometry are estimated to be around 5%. These uncertainties are smaller than the relative measurement uncertainties of about 8-10%. The activity concentration of Cs-137 in muscle tissue found ranged from 14,9 Bq/kg (Wunsiedel, Bavaria) to 4711 Bq/kg (Weinsberger Forest, Lower Austria). 33% of the samples exceeded the regulatory limits of 600 Bq/kg for consumption in Austria and Germany.
The analysis of Sr-90 in bones was performed by Liquid Scintillation Counting (LSC) after radiochemical separation. The recovery of Sr-90 during chemical processing and separation was determined by the ICP-MS measurement of Sr-86 and Sr-88. Strontium recovery from the chemical processing before separation ranges from 90% to 95%, and from the separation itself is better than 85%, depending on the condition of the resin used. Due to low activities in the most samples, relative measurement uncertainties were between 15 and 18%. In the bones of wild boars, Sr-90 activity concentration ranged from 1,4 Bq/kg (Wunsiedel) up to 70,3 Bq/kg (Kobernausser Forest, Upper Austria). Also comparison of results to prior studies investigating Cs-137 and Sr-90 in wild boars, forest plants and fungi. It could be shown that contamination of wild boars with Cs-137 occurs mainly through consumption of fungi and wild berries, whereas Sr-90 is only taken up from the stalks and leaves of plants.

About the Presenter

The presenter holds a Master's degree in Physics from the Technical University of Vienna and is currently working as an intern at the International Atomic Energy Agency (IAEA) in the Terrestrial Environmental Laboratory.

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