Radioactive Contamination Measurements of Environmental Air by Radon-222 and Daughters inside dwellings of Guarpuava-PR, Brazil

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It is well known that radon is an important source of human exposition to ionizing radiation. Concerning for this, we have made measurements of air contamination by Rn-222 and its progeny in the city of Guarapuava, Paraná State, Brazil. As Guarapuava is among the coldest cities in Brazil, it is expected higher radioactivity levels due to the poor ventilation inside dwellings during the winter. The survey was accomplished indoors, in a total of 49 dwellings, using the CR-39 plastic alpha particles detectors housed in NRPB/SSI diffusion chambers. The detectors were exposed for a period of about four months, and then they were etched chemically in a solution of $NaOH$, $6,25 mol.L^{-1}$, at a 98^0C temperature, during one hour. The analysis of the detectors was made using an optical microscope, with 100x magnification. The calibration factor used was $(2,8 \pm 0,2) tracos.m^3/cm^2.kBq.h$, provided by the detector-holder set manufacturer (Track Analysis Systems Ltd. - TASL). The average activity concentration encountered for the 49 residences were $(36,9 \pm 0,7) Bq.m^{-3}$. The residence with the highest activity concentration presented $(133.7 \pm 9.9) Bq.m^{-3}$, and the residence with the smallest activity concentration presented $(10.7 \pm 1.2) Bq.m^{-3}$. These results indicate that there is no radiological protection concern related to the exposition to Rn-222 and its progeny in the surveyed residences.