

Seasonal Variation of the Unattached Fraction and Equilibrium Factor of ^{222}Rn , ^{220}Rn

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Abstract : Radon (^{222}Rn) and its decay products are the major sources of natural radiation exposure to general population. The activity concentrations of radon, thoron gasses, and their unattached and attached short-lived progeny in indoor environment of the Jaipur and Ajmer districts of Rajasthan had been calculated via passive measurements using the Pinhole cup dosimeter, deposition based progeny sensors (DRPS/DTPS) and wire mesh capped (DRPS/DTPS) progeny sensors. The results of this study revealed that radon and thoron concentrations (CRn , CTn) are highest in the winter season. The variation of the radon and its decay products are observed to vary seasonally, but these environmental parameters seem not to be affecting the thoron and its decay product concentrations in a regular manner. The average values of the radon and its decay products are maximum in winter and minimum in summer. The equilibrium factor for radon is observed to be 0.50, 0.47 and 0.49 in winter, rainy and summer seasons. The annual average value of the unattached fraction of the radon progeny comes out to be 0.34. On the other hand, the average value of thoron (^{220}Rn) concentration and its equilibrium factor in the studied area comes to be 74, 39, 45 Bq m^{-3} and 0.07, 0.11, 0.07 respectively for the winter, rainy and summer seasons with the annual average value of the unattached fraction of about 0.18. The annual average radiological dose from exposure to indoor radon and thoron progeny comes out to be 0.88 and 0.78 mSv.

Keywords : equilibrium factor, radon, seasonal variation, thoron, unattached fraction

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