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**In-situ gamma spectroscopy; An alternative method to evaluate external effective radiation dose**

Two types of approaches are possible to estimate radiation doses from environmental radiations: (1) Measure radiation fields in the place of interest and presume that people are exposed to the same field. (2) Actual measurement on the individual members of the population studied by the use of thermoluminescent dosimeters (TLD). The latter approach though difficult is ideal. The objective of the present study was to investigate the possibility of using the first approach using *in-situ* gamma spectrometry as an alternative method to evaluate the external effective dose. The results obtained in this way provide a means of evaluating both the approaches.

Six houses were selected for this study from an area where an average radiation dose of  $5.0\mu\text{Sv h}^{-1}$  was measured using a hand held survey meter. In all study sites both TLD and *in-situ* measurements with a portable HPGe detector were carried out. The detector was calibrated for field measurements and activity concentrations of the radionuclides identified in the gamma spectra were calculated. The calculated detector efficiency values for field measurements for 1461, 1764 and 2615 keV were 2.340, 2.03 and 1.44 respectively. External effective dose was calculated using the corresponding kerma rates for the analysed radionuclides.

Kvaluation of the effective dose by the two approaches are reasonably correlated ( $r^2=0.87$ ) for dose measurements between 2.0-6.0 mSv. *In situ* measurements gave higher values than the TL readings because *in-situ* data are more representative of the surrounding. This study suggests that *in-situ* gamma spectrometry permits rapid and efficient identification and quantification of gamma emitting radionuclides on surface and subsurface soil and can be used as an alternative rapid method to determine population doses from environmental radiations particularly in an event such as a radiation contamination. TL measurements provides only an integrated dose and would require an extended time period.