

## **ASSESSMENT OF INDIVIDUAL EXPOSURE DOSE IN HIGH BACKGROUND RADIATION AREA OF TAMIL NADU, INDIA**

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South coast of India is known as the high-level background radiation area (HBRA) mainly due to the emission from beach sands that contain natural radionuclides as components of the mineral monazite. The rich deposit of monazite unevenly distributes in longer than 100 km along the coastal belt of Tamil Nadu and Kerala where inhabitants commonly live and work. In our previous study, the HPGe radiation detector identified 6 nuclides of thorium series, 4 nuclides of uranium series, and 2 nuclides belonging to actinium series in the sand samples from three different HBRA spots of the coast of Tamil Nadu. Here we conducted the individual dose assessment based on personal and indoor ambient doses of inhabitants in Tamil Nadu by using RPL glass dosimetry system for the first time. Measurement of individual and indoor ambient dose was conducted for 87 local inhabitants and in their dwellings in southern Tamil Nadu, consisting of 67 subjects from 24 villages in HBRA and 20 subjects from 12 villages in control area. Subjects were asked to wear a RPL glass dosimeter as a necklace all day long except the sleeping period. Another dosimeter for ambient dose monitoring was hung from the ceiling of the dwelling at 2m high from the floor. Measurement by a glass-tip dosimeter was performed for around 14 days, and then both individual and ambient dose assessment in a measuring period was converted to an annual dose (mSv/y). The doses for all test subjects were subtracted by the average reading in Nagercoil, the largest city in southern Tamil Nadu. A linear correlation was observed between ambient and individual personal doses for all 87 inhabitants with a correlation cofactor of 0.7653 and a slope of 0.7464 for a linear regression line. This is in good consistency with the study conducted in Kerala that obtained a slope of 0.7169 in a regression line of comparison between personal doses measured by the OSL dosimeters and estimated external doses by scintillometers. The averaged individual dose of all HBRA subjects was 2.09 mSv/y, whereas no detectable individual dose was found in control subjects. Among villages, subjects in Chinnavillai were exhibited the highest average dose of 7.17mSv/y ranging from 2.79 to 14.17 mSv/y. The person who received 14.17 mSv/y, the highest dose among all subjects, was a housewife and her lifetime cumulative dose was estimated as 921.05 mSv based on the update life expectancy data for female Indian in recent statistics by WHO.

Keywords: high background radiation, Tamil Nadu, individual exposure dose