

# Radiological Hazard Assessment and Radioactive Contour Maps in Surface Soil Samples Collected from Satun Province, Thailand

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The specific activities of natural ( $^{40}\text{K}$ ,  $^{226}\text{Ra}$  and  $^{232}\text{Th}$ ) and anthropogenic ( $^{137}\text{Cs}$ ) radionuclides in 135 surface soil samples collected from 7 districts in Satun province in the southern region of Thailand were measured and determined. Experimental results were obtained by using a high-purity germanium (HPGe) detector and gamma spectrometry analysis system. The KCL, IAEA/RGU-1, IAEA/RGTh-1 and IAEA/SL-2 reference materials were used to analyze the concentration of  $^{40}\text{K}$ ,  $^{226}\text{Ra}$ ,  $^{232}\text{Th}$  and  $^{137}\text{Cs}$  in all samples. It was found that the specific activities of  $^{40}\text{K}$ ,  $^{226}\text{Ra}$ ,  $^{232}\text{Th}$  and  $^{137}\text{Cs}$  ranged from 292.84 – 17260.59, 5.62 – 812.02, 1.49 – 409.53 and 2.04 – 16.28 Bq/kg with mean values of  $4146.73 \pm 251.13$ ,  $102.54 \pm 7.05$ ,  $124.46 \pm 4.52$  and  $5.55 \pm 2.41$  Bq/kg, respectively. Furthermore, four radiological hazard indices which are gamma absorbed dose rate (D), radium equivalent activity ( $\text{Ra}_{eq}$ ), external hazard index ( $\text{H}_{ex}$ ), and annual effective dose rate ( $\text{AED}_{out}$ ) in the investigated area were also studied and evaluated. The average values of D,  $\text{Ra}_{eq}$ ,  $\text{H}_{ex}$  and  $\text{AED}_{out}$  were equal to  $299.03 \pm 16.58$  nGy/h,  $604.83 \pm 33.07$  Bq/kg,  $1.63 \pm 0.09$  and  $0.37 \pm 0.02$  mSv/y, respectively. The results were also compared with the Office of Atoms for Peace (OAP) annual report data, Thailand and global radioactivity measurement and evaluations. Moreover, the result can be used to create the radioactive contour maps of the investigated area.

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