

Sowut Thongprajubchock 2010: Study on the Urinary Iodine-131 Excretion of Radiation Workers.
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Iodine-131 (^{131}I) is the most critical fission product radionuclide. It has the potential to be readily transferred to human by ingestion and inhalation. Nowadays, ^{131}I has been used regularly for nuclear medicine in Thailand. The activity of ^{131}I in urine is one of the most suitable indicators of the intake of radioiodine by radiation workers and the public exposed to radioiodine released into the environment. This study aimed to determine the urinary excretion rate of ^{131}I in radiation workers who were employed in Radioisotope Production Center, Thailand Institute of Nuclear Technology, namely TINT. The 24-hour urine samples were collected from 10 workers at 1, 2, 3, 4 and 7 days after radiation exposure. ^{131}I was measured by gamma spectrometry with 3 in. \times 3 in. NaI(Tl) detector. The efficiency of detector and the energy resolution, using a ^{137}Cs source, were 0.42% and 7.11%, respectively. The detector efficiency for ^{131}I from a 50 ml sample of all the 24-hour urine was measured for 1,000 s was 0.94%, the minimum detectable activity (MDA) was 2.88 Bq.

The results showed an average urinary excretion highest at 1 day after exposure which is in accordance with the value reported by the ICRP 78. The averaged excretions of ^{131}I in urine at 2, 3, 4 and 7 days after exposure were found to be 90.66 ± 3.52 , 76.85 ± 2.54 , 71.51 ± 3.97 and 63.13 ± 4.32 respectively, compared to the excretion at 1 day after exposure.

The value of ^{131}I urinary excretion obtained from this study appears to be of great significant data for the evaluation of the potential risks of ^{131}I internal exposure through its monitoring in the urine over 24 h after exposure. The data is beneficial to assess the exposure due to intake of radionuclides not only for occupation radiation protection program but also for general public due to nuclear accident.

Student's signature

Thesis Advisor's signature