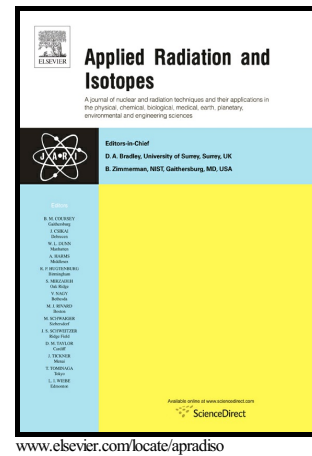


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Using Smartphone as a Motion Detector to Collect Time-microenvironment Data for estimating the inhalation dose

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ABSTRACT

During the production of iodine-131 from neutron irradiated tellurium dioxide by the dry distillation, a considerable amount of ¹³¹I vapor is dispersed to the indoor air. People who routinely work at the production area may result in a significant risk of exposure to chronic intake by inhaled ¹³¹I. This study aims to estimate the inhalation dose for individuals manipulating the ¹³¹I at a radioisotope production. By using an application installed on smartphones, we collected the time-microenvironment data spent by a radiation group during work days in 2015. Simultaneously, we used a portable air sampler combined with radioiodine cartridges for grabbing the indoor air samples and then the daily averaged ¹³¹I concentration was calculated. Finally, the time-microenvironment data jointed with the concentration to estimate the inhalation dose for the workers. The result showed that most of the workers had the annual internal dose in 1±6 mSv. We concluded that using smartphone as a motion detector is a possible and reliable way instead of the questionnaires, diary or GPS-based method. It is, however, only suitable for monitoring on fixed indoor environments and limited the targeted people.

Keywords:

Iodine-131; Motion detector; time-microenvironment; inhalation dose

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