LIQUID SCINTILLATION SPECTROMETRIC SCREENING OF POLONIUM-210 LEVELS IN URINE

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Po-210 emits alpha radiation and can only deliver a dose if the substance is eaten, inhaled or taken into the body through a wound. Po-210 decays to stable lead with a physical half-life of 138 days. This means that after 138 days, only half of the radioactivity originally present is left. Different methods can be used to measure Po-210 according to the objectives of the measurement. Generally, the greater the precision and sensitivity needed, the longer the process will take because of the need for chemical processing to separate and concentrate polonium and, to allow time for a sufficient number of radioactive decays to take place. The main objective of this work was to investigate the suitability of liquid scintillation spectrometry to provide a fast analytical procedure for the determination of Po-210 in urine samples. LSS was used as screening method for the preliminary analysis of Po-210 in 103 urine samples collected from the passengers of suspicious British Airways flights who had potentially been contaminated, after the death of Alexander Litvinenko on 23 November 2006. Further alpha spectrometric analyses of 13 samples out of 103 samples, which contained comparatively higher levels of Po-210 than the control sample have shown that, direct measurement of Po-210 in urine is possible without any sample pretreatment, when fast and accurate results are required in the case of an action plan to be undertaken and decision making required.