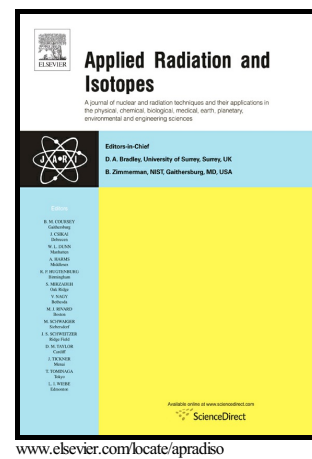


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Impurities in Tc-99m radiopharmaceutical solution obtained from Mo-100 in cyclotron

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Abstract

The gamma emitting impurities in ^{99m}Tc solution obtained from enriched molybdenum ^{100}Mo metallic target after its irradiation in a cyclotron were measured using a high-purity germanium (HPGe) detector. The radioactivity range of tested samples of ^{99m}Tc was rather low, in the range from 0.34 to 2.39 MBq, thus creating a challenge to investigate the standard measurement HPGe system for impurity detection and quantification. In the process of ^{99m}Tc separation from irradiated target the AnaLig® Tc-02 resin, Dionex H^+ and Alumina A columns were used. Fractions of eluates from various steps of separation process were taken and measured for radionuclidic purity. The overall measurement sensitivity of gamma emitters in terms of minimum detectable activity (MDA) was found at the level of 14 – 70 Bq with emission lines in range of 36 – 1836 keV resulting in impurity content range of 6.7×10^{-4} to 3.4×10^{-3} % for ^{93}Tc , ^{93m}Tc , ^{94}Tc , ^{94m}Tc , ^{95}Tc , ^{95m}Tc , ^{96}Tc , ^{96}Nb , ^{97}Nb , ^{99}Mo contaminants and 9.4×10^{-3} for ^{97m}Tc . The usefulness of the chosen measurement conditions and the method applied to testing the potential contaminators was proved by reaching satisfactory

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