

DETERMINATION OF GAMMA EMITTING RADIONUCLIDIC IMPURITIES OF ⁹⁹Mo PRODUCED BY NUCLEAR FISSION OF ²³⁵U

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Nuclear medicine is a medical modality in which nuclear properties of various radioisotopes are utilized for diagnosis and therapy of various pathologies. More than 90% of all procedures are diagnostic imaging, and more than 80% of the images are obtained by using ^{99m}Tc, radionuclide supplied by ⁹⁹Mo/^{99m}Tc generators¹. The radionuclide father ⁹⁹Mo is a fission product of ²³⁵U, therefore its chemical separation is extremely complex. For generators safe use a strict quality control of ⁹⁹Mo is necessary, including chemical, radionuclidic and radiochemical purity analysis. For the determination of the radionuclidic purity, the activities of the main radionuclidic impurities must be quantified, and their values shall not exceed a determinate percentage of the sample's total activity (values stated by the Pharmacopoeia²). IPEN-CNEN/SP routinely produces ⁹⁹Mo/^{99m}Tc generators by importing ⁹⁹Mo produced by nuclear fission of ²³⁵U and today seeks to nationalize the production of ⁹⁹Mo at its planned new *Brazilian Multipurpose Reactor*. The goal of this work is to identify and quantify the main gamma emitting impurities by gamma spectroscopy. ⁹⁹Mo samples obtained by nuclear fission of ²³⁵U imported from Argentina, South Africa and Canada were analyzed at a gamma spectrometer composed of a coaxial HPGe detector, model GX1518, coupled to a multichannel acquisition system by Canberra Inc., USA. The spectrum obtained by this technique allows qualitative and quantitative analysis of the sample's impurities. The preliminary analysis results and the established protocol will be presented.

REFERENCES

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