

## PREPARATION AND EVALUATION OF $^{99m}\text{Tc}$ -METOXY-ISOBUTYL-ISONITRILE ( $^{99m}\text{Tc}$ -MIBI)

Djokić D<sup>1</sup>, Janković D<sup>1</sup>, Stamenković Lj<sup>1</sup>, Pirmettis I<sup>2</sup>

<sup>1</sup>Laboratory of Radioisotopes, Institute of Nuclear Sciences «Vinča», Belgrade, Serbia and Montenegro,

<sup>2</sup>Institute of Radioisotopes and Radiodiagnostic Products, NCSR “Demokritos”, Athens, Greece

**AIM:**  $^{99m}\text{Tc}$ -MIBI was one of the most promising analog of  $^{99m}\text{Tc}$ -hexakis isonitrile for myocardial perfusion imaging. Now days the use of  $^{99m}\text{Tc}$ -MIBI is not only for myocardial imaging but also for breast cancer imaging.

**MATERIAL AND METHODS:** The synthesis and characterisation of 2-metohy-isobutyl-isonitrile (MIBI) for these investigations were done in “Demokritos”. After optimization of reaction parameters, MIBI was prepared as a freeze dried kit. The labelling was performed by adding of 1-4 ml of  $^{99m}\text{TcO}_4^-$  from  $^{98}\text{Mo}/^{99m}\text{Tc}$ -generator (Vinča) and heating for ten minutes. Analysis of the product enclose the radiochemical quality control as well as biodistribution study and determination of pharmacokinetical parameters. Radiochemical purity of the product was assayed by thin layer chromatography (alumina TLC and ITLC-SG) in ethanol and two solvent system (acetone/saline) respectively. All biodistribution studies were carried out in health male Wistar rats. Animals were sacrificed at different time and samples of tissues or organs of interest were removed for assay of radioactivity. The standard trichloroacetic acid (TCA) precipitation method for determining the proteine binding for  $^{99m}\text{Tc}$ -MIBI. All lipophilicity measurements were done by solvent extraction method with n-octanol.

**RESULTS AND DISCUSSION:** The freeze dried kit for  $^{99m}\text{Tc}$ -MIBI of high radiochemical purity (>90 %), stable at least 3 h after labelling, was obtained. The experimental results confirmed that the labeling yield depends on radioactive concentration of  $^{99m}\text{TcO}_4^-$ . The volume higher than 4 ml resulted in a decrease of the radiochemical purity of  $^{99m}\text{Tc}$ -MIBI. The *in vitro* studies have shown the significant hearth uptake (3.5-3.9 %/g), low blood uptake, and not so high liver activity (< 2%/g).

**CONCLUSION:** MIBI was prepared as freeze dried form. Reconstitution of the kit performed with 1-4 ml of  $^{99m}\text{TcO}_4^-$  has shown high radiochemical purity. A satisfactory biodistribution of  $^{99m}\text{Tc}$ -MIBI behaviour in helthy test animals was obtained. Additional clinical studies could confirm the promising characteristic of  $^{99m}\text{Tc}$ -MIBI.