4. COMPARISON OF THE IMPACT OF TWO VERSIONS OF REAGENT AND ANCILLARY SETS ON THE [^{18}F]FDG RADIOCHEMICAL YIELD

Katerina Kolevska[1], Maja Chochevska[1], Marija Atanasova Lazareva[1], Maja Velichkovska[1], Filip Jolevski[1], Jasmina Razmoska[1], Ana Ugrinska[1]

[1] University Institute of Positron Emission Tomography, Skopje, North Macedonia

Aim: The purpose of this study is to compare the impact of the optimised versus standard version of the reagent set and ancillary kit on the [^{18}F]FDG radiochemical yield.

Materials and Methods: [^{18}F]F^- radioisotope is produced in a cyclotron (GE PETtrace 16.5 MeV) by irradiating enriched ^{18}O water with protons.

[^{18}F]FDG radiosynthesis (a nucleophilic ^{18}F-fluorination followed by base-catalyzed hydrolysis) is conducted using an automated synthesizer IBA Synthera V2 module and a single-use disposable system – Integrated Fluid Processor (IFP) as well as reagents and ancillary set. There are two commercially available versions of these sets. In the new version of the reagents set, the molar ratio acetonitrile-water in the cryptand solution is 4:1 instead of 1:1. As the separation cartridge in the new version of the ancillary kit is used QMA Carbonate Plus Light, instead of QMA Plus Light. A modification is also made in the purification cartridges, Oasis HLB in place of the C18 cartridge.

In this study, 100 [^{18}F]FDG batches in total are analyzed. 50 batches were synthesized using the standard version of the reagent and ancillary kits, while the other 50 batches were with the optimised version.

The mean radiochemical yield (RCY), decay-corrected, and relevant standard deviation (SD) are calculated for both types of analyzed batches.

Results: [^{18}F]FDG batches produced using the optimised version of reagents and ancillary kit has higher RCY (65.01% ± 4.52%) compared to the batches produced using the standard version (57.83% ± 3.61%).

Conclusion: This study confirms that the optimisation of the reagent and ancillary sets contributes to a higher radiochemical yield of the produced [^{18}F]FDG.

Keywords: [^{18}F]FDG, radiochemical yield, synthesis