ESRR'18 – 19th European Symposium on Radiopharmacy and Radiopharmaceuticals

Optimization of production of [^{11}C]CH_3I with Methylator II for synthesis and development of [^{11}C]radiopharmaceuticals

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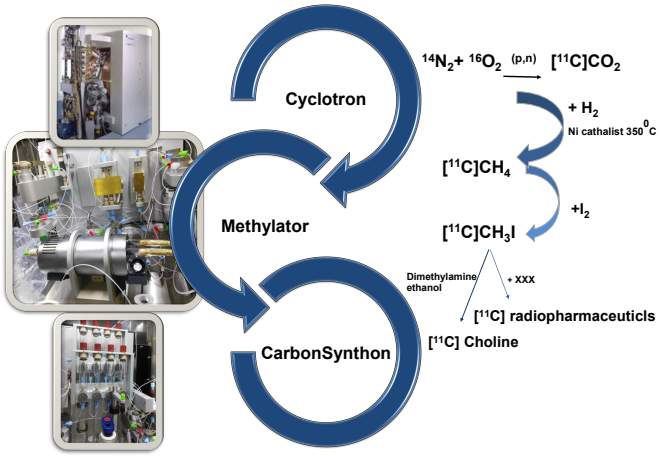
Introduction

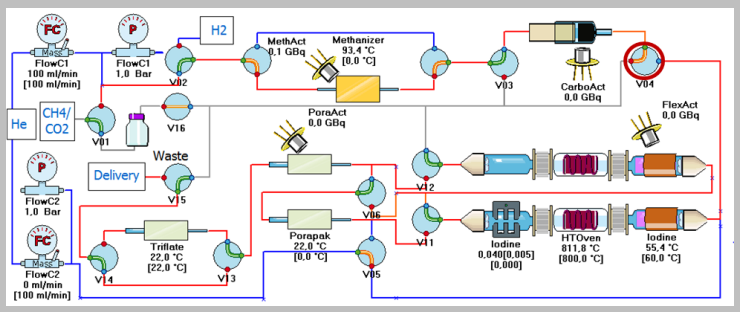
University Institute for positron-emission tomography Skopje is equipped with the Methylator II (Comecer Spa. Former Veenstra Instruments BV.), a module designed for the production of high specific activity MethylIodide ([^{11}C]CH_3I) or Methyl Triflate ([^{11}C]$CH_3OSO_2CF_3$) and CarbonSynthon I (Comecer Spa.) for production of simple ^{11}C radiopharmaceuticals.



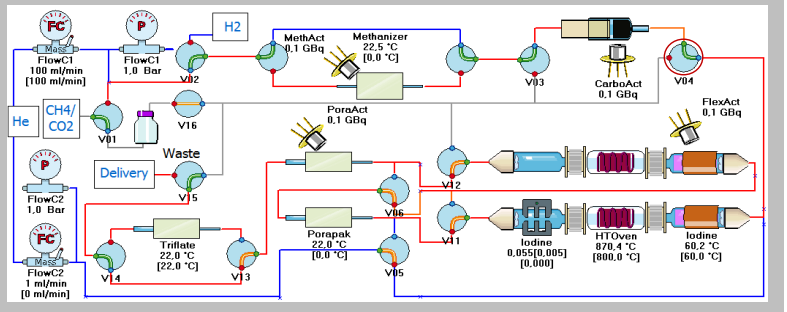
Materials & Methods

Optimization experiments where performed for maximizing the yield of [^{11}C]CH_3I. By changing the time for switching the valve V04 the effectiveness of the purification was influenced. Purification of the [^{11}C]CH_4 was done over a Carboxen 1000 column, with the knowledge that the H_2 will flow about 7 times faster than [^{11}C]CH_4 through carbon packing causing the separation of H_2 and CH_4.

In 'Active' state the formed [^{11}C]CH_4 and excess of H_2 was directed toward waste



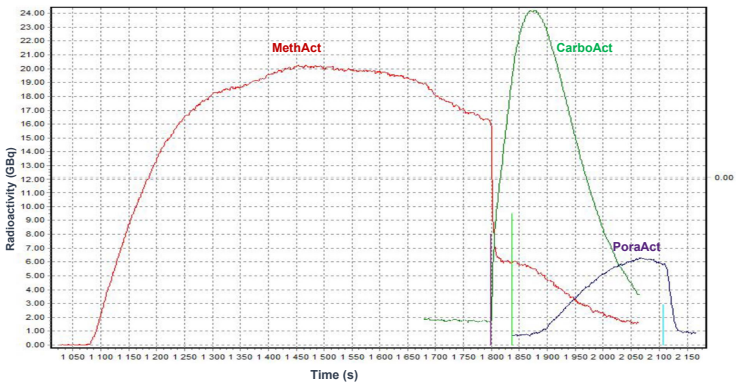
*I*n 'Inactive' state the formed [^{11}C]CH_4 in direction of the Iodine Oven.



Results

Purification time	Trapped [^{11}C]CO_2	Harvested [^{11}C]CH_3I	Yield (d.c) [^{11}C]CH_3I	Yield (d.c) [^{11}C]Choline
20s	4.5GBq 17:47	0.8 GBq 17:59 1.2 GBq 17:47	27%	22%
25s	7.2 GBq 1280s	1.25 GB 2500s 2.5 GBq 1280s	35%	25%
37s	19.564GBq 12:32	6.280GBq 12:39 8.1GBq 12:32	41.4%	34.6%

Graphic presentation of radioactivity during production of [^{11}C]CH_3I



Conclusion

The module and the software give us a big opportunity and flexibility for testing and optimization of the production achieving a better yield, and also the development of new ^{11}C radiopharmaceuticals.