



Contribution ID: 227

Type: Poster

The Synthesis of the New Phosphonates and Study of Their ^{68}Ga Complexes as the Promising Agents for Bone Imaging

Thursday, 15 May 2014 17:30 (1h 15m)

At present a large attention is given to the synthesis and study of new organic compounds as the potential components of bone imaging agents. Phosphonates are promising class of organic compounds for these purposes. Their $^{99\text{m}}\text{Tc}$ -based derivatives are used for bone imaging with the Single Photon Emission Computed Tomography (SPECT) [1]. Imaging with ^{68}Ga -labeled radiopharmaceuticals have gained growing interest, and they play an increasing role in nuclear medicine.

In this work we developed an original and useful synthetic approaches for the production of phosphonates derivatives of acyclic analogs of crown-ethers-podands [2] (I-II) and new of cyclene derivatives (III-IV).

The structures and purity of I-IV were confirmed by the NMR ^1H , ^{13}C and ^{31}P spectroscopy and of complexes of phosphonates I-IV were investigated as the promising agents for bone imaging with the Positron Emission Tomography (PET).

Thin layer chromatography (TLC) systems was used for the analysis of ^{68}Ga -labeling reaction products. Two systems were found to be the best. First system comprises silica gel instant TLC (ITLC) plates with the 0.1 M citric acid solution as mobile phase. Second system comprises aluminum backed silica gel plates with the mixture of acetonitrile/water at a ratio of 1:1 as mobile phase.

The effect of conditions on the labeling process was studied. The influence of the pH, concentration of the ligand and the reaction temperature on the yield of labeling was examined.

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2. Baulin V.E, Syundyukova V.Kh.,Tsvetkov E. N. Phosphoryl-containing podands. Acid type monopodands with phosphinylphenylic terminal groups // Zh. Obshch. Khim. (in Russian), 1989, No.1,P.62-67.

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Session Classification: Poster Session - Radiopharmaceutical Chemistry, Labelled Compounds

Track Classification: Radiopharmaceutical Chemistry, Labelled Compounds