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Methodology for labeling silica sand with ^{99m}Tc for using as solid radiotracer

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For decades, the great economic benefit that represents the use of radiotracers has been recognized by the international industry, however, this technique is still underutilized. The main cause is the lack of timely availability of required radiotracer. Previous studies show the possibility of labeling sediments (with a high content of aluminosilicates) with ^{99m}Tc. This paper aims to develop a methodology for labeling silica sand with ^{99m}Tc for using as solid radiotracer. Labeling the pretreated silica sand and untreated using varying concentrations of stannous fluoride and chloride as reducing agents and different times labeling was performed. The influence of different parameters of the pretreatment of sand in labeling yields obtained was evaluated and the effectiveness of the methods used to reduce $^{99m}TcO_4^-$ ($R_{red\%}$ > 87%) by ascending paper chromatography was proved. Changes in the composition of the silica sand after its pretreatment is able to observe from SEM-EDS techniques. It was possible to establish a methodology for obtaining solid ^{99m}Tc labeled radiotracers in support of silica sand with an estimated preparation time of 4 hours a $R_{ret\%}$ equal to 74% (or a methodology for obtaining solid radiotracers labeling with ^{99m}Tc in support of silica sand with an estimated preparation time and a $R_{ret\%}$ equal to 74%).

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