

Effect of ventilation images on observer interpretation of lung perfusion examinations. *Am J Roentgenol* 128: 1037-1038, 1977

Rapid Miniaturized Chromatographic Quality-Control Procedures for Tc-99m Radiopharmaceuticals

To those of us in nuclear pharmacy responsible for the preparation of Tc-99m radiopharmaceuticals, a simple and rapid chromatographic system is a valuable tool for the daily quality control of radiopharmaceuticals before the patient doses are dispensed. The technique recently presented by Zimmer and Pavel (1) is indeed simple and rapid and, as such, is representative of the "state of the art" in Tc-product quality control. However, some of the procedures described for the development and evaluation of the system need clarification.

Figure 1 illustrates the 1 cm x 6 cm strip as described by Zimmer and Pavel. The solid lines at 1, 3, and 5 cm are the origin (or.), center line (c) and solvent front (sf), respectively. The dotted lines show where the strip was "cut into eight equal segments: four below the center line and four above." The cross-hatched area represents the colored tape added to each strip for identification.

According to Fig. 1, if the radioactivity remained at the origin during chromatographic development, as expected for particulate radiopharmaceuticals, then the maximum activity would be counted in Segment 2, rather than Segment 1, as reported. No activity would be counted in Segment 1 unless the applied spot was quite large (>5 mm dia.) or the activity migrated before the strip was dried—highly unlikely for insoluble particles. Similarly, if development was stopped when the solvent front reached the 5 cm pencil line, no activity at all would be counted in Segment 8. As much as 96.9% of the radioactivity was reported in Segment 8 for the soluble Tc-complexes on ITLC-SG paper developed with normal saline. Although the precise segmental positioning of the activity appears to be in error as reported, no error results when the strips are cut at the center line and each half is counted separately.

Examination of the segmental distribution of radioactivity for Tc-99m Sn pyrophosphate on 31 ET paper developed in acetone revealed 21% of the activity in Segments 5-8, indicating 21% free pertechnetate. The authors, however, commented that these "unusually high values for the hydrolyzed reduced Tc-99m fraction in Tc-99m pyrophosphate" were

consistent with those obtained from commercial chromatography kits. The data reported using ITLC-SG paper and normal saline showed only 1.3% of the activity as hydrolyzed reduced Tc-99m. Accordingly, one could easily question the amount of available stannous tin in the pyrophosphate kit(s) used in the chromatographic study.

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REFERENCE

1. ZIMMER AM, PAVEL DG: Rapid miniaturized chromatographic quality-control procedures for Tc-99m radiopharmaceuticals. *J Nucl Med* 18: 1230-1233, 1977

Reply

We welcome the comments made by Dr. Mock regarding the miniaturized chromatography system developed in our laboratory. Indeed, the statement regarding the cutting of the strips for counting does need some clarification. As illustrated in Fig. 1, the strips were cut into eight equal segments: four below and four above the center pencil line. However, the strips were cut in such a manner that the initial strip section (strip section number 1) encompassed the origin (0.3 cm below the bottom pencil line) and the last strip (strip section number 8) encompassed the solvent front (0.3 cm above the top pencil line).

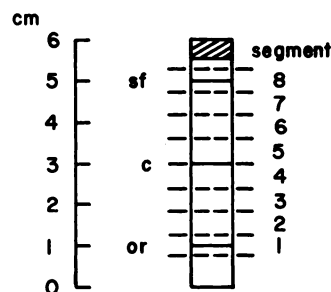


FIG. 1. Diagram of chromatographic strip.

Regarding the results of the chromatographic evaluation of Tc-99m-Sn-pyrophosphate, there is indeed a free pertechnetate level of 21% in the example given, using 31ET paper chromatography. This value has nothing whatsoever to do with the hydrolyzed reduced Tc-99m level and can only be determined using ITLC-SG paper and normal saline. The comments regarding "unusually high values for hydrolyzed reduced Tc-99m fraction in Tc-99m pyrophosphate" refer to commercial chromatography kits, which do not use ITLC-SG paper chromatography. In this case there is an overestimation of the amount of hydrolyzed reduced Tc. The phenomenon has been observed not only by us, but also by other investigators including Colombetti et al. (1).

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REFERENCE

1. COLOMBETTI LG, MOERLIEN S, PATEL GC, et al:

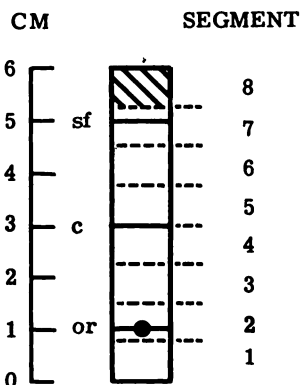


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