

A SIMPLIFIED METHOD FOR QUALITY CONTROL OF GAMMA AND BETA RADIOPHARMACEUTICALS USING STORAGE PHOSPHOR SCREEN TECHNOLOGY

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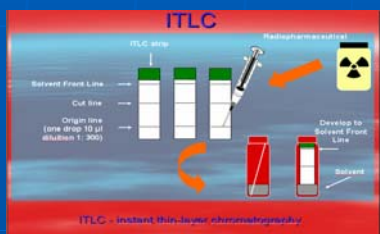
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INTRODUCTION: To satisfy the requirements for Good Manufacturing Practice in Nuclear Medicine, all radiopharmaceuticals employed for diagnostic and therapeutic applications must be subjected to a quality control (QC) step to determine radiochemical purity (RP).

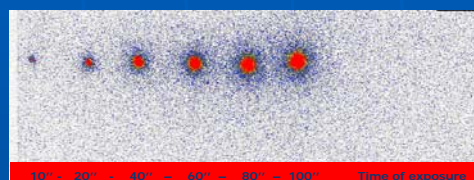
AIM: The purpose of this study was to validate a simplified QC method for γ and β radiopharmaceuticals using storage phosphor screen technology (in this case the Perkin Elmer Cyclone Imager) and also to optimize the Cyclone Opti-Quant control and data analysis software for day to day use.

MATERIAL AND METHODS:

All γ and β radiopharmaceuticals habitually used in our Laboratory (diluted 1:300 in normal saline) were tested by instant thin-layer chromatography (ITLC).



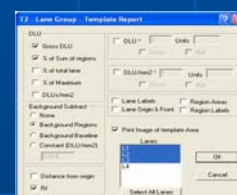
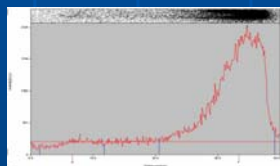
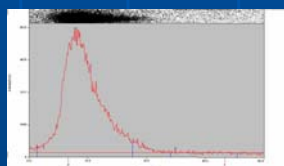
The chromatographic strips were tested by exposing phosphor screens (Multisensitive Medium MS) for progressively longer times (from 10 to 100 seconds) to establish the optimum length of exposure (the average for our strips was 20 seconds).



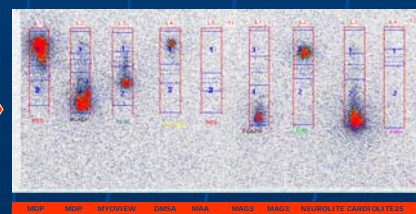
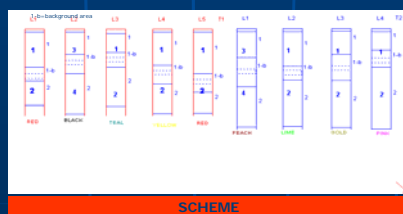
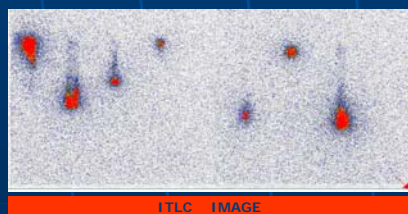
Then 10 ITLCs for each radiopharmaceutical were run in order to calculate the average of distribution areas of radiopharmaceutical and its impurities, and to found the background area.



As Cyclone can simultaneously measure different chromatographic strips, a minimum distance of 15 mm was defined between the strips, to avoid images being superimposed. The results of 30 ITLCs measured by Cyclone and by γ -counter were compared, with a high level of agreement (correlation coefficient 0.99).



Finally, using the lanes template in the OptiQuant software, we saved the exact dimensions of the chromatographic strips, the distribution areas at the origin (O) and at the solvent front line (F), and the background area for every radiopharmaceutical in a scheme. The same scheme was employed to put the strips in exact positions.



RESULTS : This method is easy for users at any level of computer expertise. A screen can be scanned, the image analyzed and the results of RP reported for various chromatographic strips at the same time, with high sensitivity and resolution, clearly visualizing the distribution of the radiopharmaceutical and its impurities. The scheme of lanes templates saved in the OptiQuant software allows a rapid, automatic and exact measure of RP (less than 2 minutes for 9 different strips run simultaneously), giving a profile for a graphical representation of the data.

CONCLUSION : This simplified method for measuring radiochemical purity is rapid, easy, optimized, standardized and minimizes any variation due to individual user technique.