Journal of Chromatography, 84 (1973) 417–418

CHROM. 6835

Note

Paper chromatography of ^{113m}In-labelled radiopharmaceuticals: [^{113m}In]DTPA

D. K. JAISWAL, JAGDISH CHANDER, ASHA MALIK AND BIKRAM SINGH
Institute of Nuclear Medicine and Allied Sciences, Probyn Road, Delhi-7 (India)
(Received May 25th, 1973)

The rapid growth of the use of short-lived radiopharmaceuticals in nuclear medicine is associated with the development of analytical techniques, such as chromatography, that can be used to identify various components in these products. Radiopharmaceuticals incorporating ^{113m}In ($T_{\frac{1}{2}}$ = 100 min) are being widely used in organ scanning. The paper chromatography of ^{113m}In-labelled radiopharmaceuticals for brain, placenta, liver and spleen scanning is described in this paper.

METHODS AND MATERIALS

A 25 mCi ^{113m}In generator obtained from the Radiochemical Centre, Amersham, Great Britain, was used for the preparation of ^{113m}In-labelled radiopharmaceuticals. ^{113m}In was eluted as indium chloride with 6 ml of 0.04 *N* HCl. The following preparations were made according to published methods:

(*i*) ^{113m}In–gelatin complex for placental scanning[1].

(*ii*) [^{113m}In] indium hydroxide colloid for liver and spleen scanning[2].

(*iii*) [^{113m}In]DTPA chelate for brain scanning[3]. This was also prepared from a brain scanning kit (Code No. 80) supplied with the indium generator. The preparation was carried out by injecting 5 ml of generator eluate into a vial containing component A (a sterile aqueous solution of DTPA and acetic acid) followed by the injection of 1.0 ml of component B (a sterile aqueous buffer containing 31.7 mg of trometamol).

The preparations were chromatographed on Whatman No. 1 paper using the ascending technique in the following solvents: 0.1 *N* HCl; 0.1 *N* NH_4OH; 0.1 *N* NH_4OAc; 3% NaCl; and 85% methanol. The chromatograms were cut into 1 × 2 cm strips and counted in a Nuclear-Chicago automatic well counting system, Model 4219 (Nuclear-Chicago, Des Plaines, Ill., U.S.A.).

RESULTS AND DISCUSSION

For the chromatography of short-lived radiopharmaceuticals, it is desirable to use solvent systems that have rapid flow-rates. In general, mixtures of organic solvents provide good separations but have the disadvantage of slow runs. Aqueous solvents, which are usually fast, appear to be suitable for ^{113m}In-labelled radiopharmaceuticals.

The R_F values of various ^{113m}In-labelled preparations in different solvents are shown in Table I.

TABLE I

R_F VALUES OF ^{113m}In-LABELLED RADIOPHARMACEUTICALS

Solvent	*Time (h)*	*Solvent front (cm)*	R_F*			
			Indium chloride	*Indium–gelatin complex*	*Indium hydroxide colloid*	*Indium–DTPA***
0.1 *N* HCl	1	19–21	0.92	0.90	0.75 (T)	0.93
0.1 *N* NH_4OH	1	19–20	0.03	0.03 (T)	0.03	0.31 (T)
0.1 *N* NH_4OAc	1	19–20	0.03	0.03	0.03	0.95
3% NaCl	1	18–19	0.03 (T)	0.03	0.03	0.95
85% Methanol	1.5	16–17	0.06	0.03	0.03	0.44

* T = tailing.
** Prepared according to Hill *et al.*[3].

It can be seen from Table I that the R_F values for indium chloride, the indium–gelatin complex and indium hydroxide colloid preparations are very similar. The [^{113m}In] indium hydroxide colloid also shows an unidentified peak (<3%) along the solvent front in 3% NaCl.

[^{113m}In]DTPA is well separated in 0.1 *N* NH_4OAc, 3% NaCl and 85% methanol. [^{113m}In]DTPA as prepared from the brain scanning kit and by the procedure of Hill *et al.*[3] showed similar chromatographic behaviour. A few preparations showed another small peak (<4%) in 85% methanol, which probably corresponds to indium hydroxide[3]. It can be concluded that the above solvent systems are suitable for determining the radiochemical purity of [^{113m}In]DTPA preparations.

ACKNOWLEDGEMENTS

We are grateful to Col. S. K. Mazumdar and Dr. K. P. Chakraborty for their interest in this work.

REFERENCES

1 J. E. Huddlestun, F. S. Mishkin, J. E. Carter, P. D. Dubois and I. C. Reese, *Radiology*, 92 (1969) 587.
2 J. Sewatkar, M. C. Patel, S. M. Sharma, R. D. Ganatra and J. L. Quinn, *Int. J. Appl. Radiat. Isotop.*, 21 (1970) 36.
3 J. Hill, M. J. Welch, M. Adatepe and E. Pochen, *J. Nucl. Med.*, 11 (1970) 28.