

A SIMPLE WAY TO MAKE IRON (^{113m}In) HYDROXIDE PARTICLES

We have had erratic results in preparing iron (^{113m}In) hydroxide for a lung scanning agent using published methods (1). We learned from Henry Kramer that this was partly because the characteristics of the eluate from our ^{113}Sn - ^{113m}In generator (obtained from Neisler Laboratories) differed from those of the generators used previously because the generator contained fewer impurities. He suggested that we use a higher concentration of ferric ion and a lower concentration of U.S.P. granular gelatin (2). Using this information, we have developed what has proven to be a very simple, short and reasonably reliable method for producing particles for lung scanning.

We used the following materials:

- 0.05 N HCl ($p\text{H}$ 1.5) for eluting the generator
- 5 mg of $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ per 1 ml of 0.1 N HCl
- 0.56 N NaOH (22.5 mg NaOH per 1 ml sterile water; $p\text{H}$ 12.5)
- NaCl 120 mg per 1 ml of sterile water
- 10% U.S.P. granular gelatin in sterile water ($p\text{H}$ 6.0)

All solutions are added rapidly to a mixing vial that is shaken by a long pair of tongs. The $p\text{H}$ is not meticulously adjusted, but samples may be taken to check the progress of the reaction.

The procedure is as follows:

1. The ^{113}Sn - ^{113m}In generator is eluted with 5.5 ml of 0.05 N HCl. The eluate is checked for tin breakthrough with a hematoxylin spot test according to the supplier's directions. 5 ml of the eluate is placed in a vial.
2. 0.1 ml of the ferric chloride solution (100 μg ferric ion) is added at once while the vial is being shaken.
3. 0.5 ml of 0.56 N NaOH is immediately added while the vial is being shaken. A brownish precipi-

tate will form at this time or may be delayed until the next step. The $p\text{H}$ should be about 12.

4. 0.5 ml of 12% NaCl is immediately added while shaking the vial. This will salt out the precipitate of iron (^{113m}In) hydroxide if it is not already present. The $p\text{H}$ will be about 11.5. The mixture is stirred vigorously for 3 min and a sample is checked microscopically for particle size on a hemocytometer. If the size is too small, the $p\text{H}$ is adjusted with NaOH to more nearly 12.

5. 1 ml of 10% gelatin is added, and the vial is shaken for 2 min. A sample is then taken for microscopic inspection, and the vial is capped and autoclaved for 20 min at 250°F at a pressure of 15 lb/in.² The $p\text{H}$ will be about 7.

6. Calibration is performed with a Cutie Pie, and specific activity is based on a total volume of 7.1 ml.

The actual preparation time is quite short, taking only about 10 min. The method is simple and reproducible so that a technician can be trained easily to carry out the procedure. Checking the particle size by direct microscopic inspection, we find that it is reasonably uniform, ranging from 30 to 50 microns in diameter. We were unable to detect any difference between the samples inspected before and after autoclaving. By counting on a hemocytometer, we found we had a concentration of about 60,000 particles/ml.

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REFERENCES

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