

Technical Procedure for Potassium Iodide

1.0 Purpose - This procedure describes how to make the potassium iodide solution and apply it to items of evidence.

2.0 Scope - This procedure applies to porous items of evidence that are to be examined for the presence of latent prints. Potassium iodide is a processing technique that darkens interfering backgrounds and chemically lightens prints on porous materials containing starch. It is used after treatment with physical developer and sodium hypochlorite. Photography shall be performed while the item is submerged in solution.

3.0 Definitions – N/A

4.0 Equipment, Materials and Reagents

4.1 Equipment and Materials

- Laboratory coat and gloves
- Magnetic stirrer, magnetic follower and magnetic retriever
- Glass beakers
- Graduated cylinders
- Dark, shatter-proof container
- Forceps (soft tipped)
- Glass trays
- Camera/scanner

4.2 Reagents

- Potassium iodide (5 g)
- Ferric nitrate (30 g)
- Ammonium ferrous sulfate (80 g)
- Citric acid (20 g)
- Distilled water (925 mL)

5.0 Procedure – Potassium iodide consists of a working solution which is made from two (2) stock solutions. The stock solutions must be stored in a dark place and/or in a dark, shatter-proof container. Before processing, wipe all internal surfaces of the beakers with paper towels under cold tap water and rinse three (3) times with distilled water. After completion of all processes, wash glassware with tap water and dry with a clean cloth or paper tissue.

5.1 Chemical Preparation

5.1.1 Solution #1 – Potassium Iodide Solution

5.1.1.1 Place twenty-five (25) mL of distilled water into a clean fifty (50) mL glass beaker with a magnetic follower.

5.1.1.2 Add five (5) grams of potassium iodide to the distilled water and stir to ensure the solution is thoroughly mixed. Stir until the potassium iodide is completely dissolved.

5.1.1.3 Transfer the solution to a dark, shatterproof container.

5.1.2 Solution #2

5.1.2.1 Place nine hundred (900) mL of distilled water in a clean two thousand (2000) mL glass beaker with a magnetic follower.

5.1.2.2 Weigh the following chemicals and add them to the distilled water in the listed order while stirring. Each must fully dissolve before adding the next.

- Ferric nitrate (30 g)
- Ammonium ferrous sulfate (80 g)
- Citric acid (20 g)

After all contents have dissolved in solution, stir for an additional five (5) minutes. The solution should appear yellow.

5.1.2.3 Transfer the solution to a dark, shatterproof container.

5.1.3 Working Solution

5.1.3.1 Place one hundred ninety (190) mL of Solution # 2 in a clean four hundred (400) mL glass beaker with a magnetic follower.

5.1.3.2 Add ten (10) mL of Solution #1 (potassium iodide) to the solution with continuous stirring.

5.1.3.3 Due to the sensitivity of the chemicals, the working solution shall only be mixed as needed.

5.2 Processing Procedures

5.2.1 Forensic Scientists shall produce a self-made test print to be processed concurrently with items of evidence (see Section Technical Procedure for Ensuring Quality Control).

5.2.2 When processing items of evidence, one (1) glass tray will be needed to complete the procedure. Forceps without serrated edges shall be used to handle item(s).

5.2.3 Working Solution

5.2.3.1 Place entire amount of working solution into a glass tray.

5.2.3.2 Completely submerge one (1) item at a time in the solution until impressions are enhanced. Enhancement should occur immediately.

5.2.3.3 Set up a camera and tripod directly over the tray.

5.2.3.4 Flip the item over using the non-serrated forceps in order to photograph both sides (see Photographic Equipment/Procedures and Image Processing). In order to avoid reflections from the solution, do not use the flash.

5.2.3.5 Submerge and photograph each item separately.

5.2.3.6 Remove the item from the solution and allow the item to dry.

5.2.4 Preservation of Developed Impressions – Preserve the developed impressions through photography (see photographic equipment/procedures) and/or by electronic recording (see Section Image Processing Procedure).

5.2.4.1 The item may return to its original color when dry unless additional treatment with iodine is performed (see Tincture of Iodine Solution Procedure).

5.2.4.2 In order to avoid reflections, do not use the camera-mounted flash while photographing. Increase the aperture to F16 to increase the depth of field.

5.3 Standards and Controls – N/A

5.4 Calibration – N/A

5.5 Sampling – N/A

5.6 Calculations – N/A

5.7 Uncertainty of Measurement – N/A

6.0 Limitations

6.1 To stabilize the light colored print on a dark background, an additional two percent (2 %) tincture of iodine solution can be used to maintain the contrast of the dark background and light print (see Tincture of Iodine Solution Procedure).

6.2 Future research efforts include spray-on starch for those items that do not naturally contain starch.

6.3 Shelf Life

6.3.1 Potassium iodide, ammonium ferrous sulfate, citric acid, and ferric nitrate - Indefinite if stored properly.

6.3.2 Solution #1 (potassium iodide) – Five (5) months.

6.3.3 Solution #2 – One (1) month.

6.3.4 Working solution - Mixed as needed.

7.0 Safety

7.1 Potassium Iodide has been shown to produce fetotoxicity in newborns and adverse reproductive effects in humans. Forensic Scientists who are, or may be, pregnant shall not be exposed to this chemical.

7.2 If contact with this chemical occurs, immediately flush area with water.

7.3 Protective gloves, eyewear, and clothing shall be worn. Also avoid ingestion, inhalation and contact with skin and eyes.

8.0 References

Kent, T., ed. *Manual of Fingerprint Development Techniques: A Guide to the Selection and Use of Processing for the Development of Latent Fingerprints*. Police Scientific Development Branch, London (July 1992).

Lee, H.C. "Methods of Latent Print Development." *Proceedings of the International Forensic Symposium on Latent Prints*. (July 1987): 15–24.

Lennard, C.J. and P.A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints." *Proceedings of the International Forensic Symposium on Latent Prints*. (July 1987): 141-142.

Manual of Fingerprint Development Techniques: A Guide to the Selection and Use of Processes for the Development of Latent Fingerprints. Scientific Research and Development Branch, London (1986).

Trozzi, T.A., R.L. Schwartz and M.L., Hollars. *Processing Guide for Developing Latent Prints*. (2000): 1-64.

US Department of Justice. *Chemical Formulas and Processing Guide for Developing Latent Prints*. FBI Laboratory Division, Latent Fingerprint Section (1994).

9.0 Records – N/A

10.0 Attachments – N/A

Revision History		
Effective Date	Version Number	Reason
09/17/2012	1	Original Document