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Merbromin

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Name of Procedure:

Merbromin

Suggested Uses:

Merbromin may be utilized in conjunction with a laser and/or alternate light source to develop latent impressions in blood. This technique may be used on porous or non-porous surfaces. Merbromin will cause the blood on an item to fluoresce yellow and is not recommended on items which fluoresce the same color.

Equipment Needed to Perform Procedures:

- A - Rubber apron and rubber gloves
- B - Magnetic stirrer, magnetic follower and magnetic retriever
- C - Glass beakers
- D - Heating Mantle
- E - Dark shatter proof storage container (four (4) liters)
- F - Measuring cylinders
- G - Camera (35 mm, 2 1/4, MP-4, CU5, TC III)
- H - Fume hood
- I - Refluxing kit
- J - Mist sprayers
- K - Boiling stones

Chemicals Needed For Preparation of Chemical Solution(s):

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A - 0.45 grams Merbromin

B - Ten (10) grams of Zinc Metal (mossy)

C - One-Hundred (100) ml of ethanol

D - Fifteen (15) ml of Formic Acid

E - Three (3) ml of 3 % Hydrogen Peroxide

F - Forty-seven (47) ml of Acetone or Ethyl Ether

G - Twenty-five (25) ml of 2 % Mercurochrome

Formula/Directions for Preparation of Chemical Solution(s):

With this process there is a choice of the stock solutions which may be prepared. Either stock solution may be used; however, the two (2) working solutions must be prepared to complete this process.

Stock Solution A:

1. Reflux the following chemicals until the solution becomes colorless:
 - a. 0.45 grams of Merbromin
 - b. One-hundred (100) ml of ethanol
 - c. Ten (10) grams Zinc Metal (mossy)
 - d. Fifteen (15) ml of Formic Acid
2. Decant the solution and store in a dark shatterproof bottle or container.

Stock Solution B:

1. Reflux the following chemicals until the solution becomes colorless:
 - a. Twenty-five (25) ml of 2 % Mercurochrome
 - b. Seventy-five (75) ml of ethanol
 - c. Ten (10) grams Zinc Metal (mossy)

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- d. Fifteen (15) ml of Formic Acid
2. Decant the solution and store in a dark shatterproof bottle or container.

Working Solution A- Merbromin Solution:

1. Place ten (10) ml of the merbromin stock solution prepared in a large clean beaker with a magnetic stirrer.
2. Add twenty (20) ml of Ethyl Ether or Acetone. Stir the solution until thoroughly mixed.
3. Place the solution in a mist sprayer until needed.

Working Solution B - Hydrogen Peroxide Solution:

1. Place twenty-seven (27) ml of Ethyl Ether or Acetone in a clean one-hundred (100) ml beaker with a magnetic stirrer.
2. Add three (3) ml of 3 % Hydrogen Peroxide to the Ethyl Ether or Acetone. Stir the solution until thoroughly mixed.
3. Place the solution in a mist sprayer until needed.

Processing Procedures for Application to Item(s) of Evidence:

Prior to spraying the item of evidence with any of the solutions, the bloody impression must be dried or cured. This procedure is necessary to keep the print from dissolving when the solution is applied.

1. Carefully spray the item of evidence with working solution A - Merbromin Solution. Allow the area to completely dry. Spray the item a second time again allowing the area to completely dry prior to proceeding. A fine mist is highly recommended when spraying the item of evidence.
2. After the second application of Working Solution A has completely dried, carefully spray the item with Working Solution B -Hydrogen Peroxide Solution. Spray the item a second time again allowing the area to completely dry prior to proceeding. A fine mist is a **must** when spraying the item of evidence with the

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Hydrogen Peroxide solution.

3. Examine the item of evidence with the appropriate laser and/or alternate light source to locate the impression(s) (See Laser/Alternate Light Sources).

Steps to Preserve Developed Impressions:

The most appropriate methods to preserve developed impressions is through photography, using the proper techniques (See Photographic Equipment/Procedures) and/or electronically recording the impressions (See Image Processing).

The latent impressions developed with Merbromin must be photographed immediately as exposure to air will slowly cause the development of a fluorescent background which will mask the latent impression.

Safety Concerns:

Ethyl Ether is explosive and should be substituted with Acetone whenever possible.

The toxic and carcinogenic properties of Merbromin have not been thoroughly investigated and should be handled with extreme care.

Hydrogen Peroxide will irritate the skin and eyes especially when used in conjunction with other solvents (Acetone, etc.)

All mixtures should be conducted in a fume hood with rubber gloves and aprons.

Storage and Location of Chemicals and Solutions:

Merbromin and Zinc Metal should be stored in the original shipping container until needed.

3 % Hydrogen Peroxide should be stored in the original shipping container until needed.

Formic Acid and Acetone should be stored in a flammable cabinet until needed.

Stock solutions should be stored in dark shatterproof containers or bottles.

Shelf Life:

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Merbromin, Zinc Metal - Indefinite

Formic Acid, Hydrogen Peroxide and Ethyl Ether - Indefinite if stored properly

Stock and Hydrogen Peroxide Solutions - Indefinite if stored properly

Working Solution - Immediate use only.

Other Information:

Merbromin will fluoresce yellow in color and should not be used on items which fluoresce the same color.

Great care should be taken when applying the solutions as blood prints could be easily destroyed in this procedure.

The merbromin will react with the heme in the blood to produce a highly fluorescent product.