

RESEARCH – EVALUATION – VALIDATION

OF

BLUESTAR® FORENSIC

THROUGH

PRACTICAL EXPERIMENTATION

OCTOBER 2004

Experiments prepared, tested, and evaluated by

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In early October 2004, at an International Association of Bloodstain Pattern Analysts Seminar in Tucson, Arizona USA, Special Texas Ranger John Aycock was introduced to a product called BLUESTAR® FORENSIC which is a chemical currently used by crime scene investigators to detect latent bloodstain. Some of the product in tablet packet form was obtained by Ranger Aycock for evaluation purposes.

1. Preparation of the experiments

On October 15, 2004, the following experiments were prepared by Ranger Aycock utilizing bovine blood.

Experiment A

Undiluted bloody handprints were placed on each shoulder of a used, nearly worn-out tie-dye T-shirt constructed of 100% preshrunk cotton material.

Additionally the remainder of blood was wiped from the hands onto the inside portion of the T-shirt.

This experiment was allowed to partially dry, then was washed with a soak function in a conventional washing machine alone using cheer detergent and bleach with both hot and cool wash and rinse cycle. No blood stain was visible.

The tie-dye T-shirt was then allowed to air dry in the sun and was placed rolled up in the trunk of a car in Coryell county, Texas, until October 19, 2004, 4:00 p.m. when in mills county, Texas, the tie-dye T-shirt, experiment A, was taken from the trunk and taped to a jail cell wall at the mills county jail for experimental and demonstration purposes for a group of police students.

Lighting conditions inside the jail cell were controlled from nearly total darkness to half dark.

Experiment B

An undiluted bloody right hand print was placed on the outside left shoulder of a black D.A.R.E. T-shirt constructed of 50% cotton and 50% polyester material.

An undiluted cast off bloodstain pattern was placed on the front of the D.A.R.E. T-shirt using a four-inch wide buck-folding knife that had been soaked in undiluted blood. The knife was swung with the left hand and laid the stain from right to left across the front of the shirt.

The bloody knife and semi-bloody hands were wiped with the inside portion of the black D.A.R.E. T-shirt.

Experiment B was allowed to air dry in the sun for a period of two and one-half hours, then was picked up and shaken, then visually observed. No bloodstains could be seen with the naked eye on experiment B.

Experiment B was rolled up and stored in the trunk of an automobile, in Coryell county, Texas, until October 19, 2004, when it was removed in mills county, Texas, and taped to a shower stall wall in a cell at the mills county jail for experimental and demonstration purposes for a group of police students. Lighting conditions inside the shower stall were from total darkness to very diminished light, darker than experiment A.

Experiments C, D, and E:

Experiment C

Experiment C was a loosely woven carpet material of nylon, polyester, and cotton, a commonly used bath mat with a worn rubber backing, being 34 inches long and 20 inches wide with fringed carpet material on each end. Various colors made up this bath mat which was multicolored containing dark green teal, light rose, purple, and maroon strands of woven carpet approximately nine millimeters in height.

Experiment C was laid on a tile floor outside of a shower tub combination in a bathroom in Coryell County, Texas. Experiments D and E to be explained where placed on the floor in front of the bath mat, experiment C.

An amount of bovine blood was placed on the preparer's legs below the knees and shower water was used to spray off the blood. Water was allowed to remain in the tub. The preparer stepped out of the shower tub.

Combination and onto the bath mat, experiment C, walking the length of the mat and onto experiments D and E leaving latent diluted bloodstain on all three experiment surfaces.

Experiment D

Experiment D was two pieces of 9-inch by 9-inch square, one millimeter thick tan-colored linoleum tile smooth surfaced, which at one time was placed in a home with an adhesive troweled backing for cementing to the floor. These tiles are common in older homes world war II period to date.

Experiment E

Experiment E was a six by six inch square piece of Mexican tile unused, one-half inch thick being dark reddish brown in color and having a textured surface.

Experiments C, D, and E were removed outside and allowed to air-dry in the sun for a period of three hours. Experiments C, D, and E were placed in the trunk of an automobile in Coryell county, Texas, until October 19, 2004, when they were removed and placed on the floor inside a jail cell at the mills county jail in Goldthwaite, Texas, for experimental and demonstration purposes for a group of police students.

Storage weather conditions in the trunk were from 50 degrees F to 100 degrees F.

Experiment F

An additional experiment was prepared by Blake Goertz in the Waco Lab by placing diluted latent hand stains in blood on brown paper.

2. Testing procedure

In Goldthwaite, Texas, during a violent crimes and homicide investigation school, the class was divided into two groups, one group would tour a bloody scene and the other group would observe the experimentation using the normal preparation of Luminol, BLUESTAR® FORENSIC, and a preparation of Amido Black.

One preparation of BLUESTAR® FORENSIC using two tablets and four ounces of distilled water was prepared by Blake Goertz, Joyce Marek, and a class of police investigators for demonstration purposes. This mixture was placed into a common plastic hand pump spray bottle used by laboratories for the mist distribution of liquids.

A mixture of traditional Luminol was also prepared.

Joyce Marek summoned half of the class into the jail cell and positioned them so they could observe the procedures. Marek delivered both traditional Luminol and BLUESTAR® FORENSIC onto surfaces a through F at various times for the class observation. A fine mist was sprayed with BLUESTAR® FORENSIC and Luminol using separate sprayers.

This procedure would be repeated at least five times for the group on each exhibit. BLUESTAR® FORENSIC reaction was the same each time items were sprayed.

3. Results and evaluation

3.1. About the reactions

The observation of the BLUESTAR® FORENSIC application versus traditional Luminol would show that the BLUESTAR® FORENSIC reaction was quicker to react and lasted for a longer period of time than did the traditional Luminol. BLUESTAR® FORENSIC additionally had a more intense luminescence than the traditional Luminol. In fact, it was three times as bright.

Experiment A, tie-dye T-shirt, reaction to BLUESTAR® FORENSIC actually showed the stained areas initially put on to the shirt in somewhat of a different luminescence than the bleach areas.

Experiment B, the black D.A.R.E. T-shirt, yielded exact size and shapes of the initial stains for a longer period of time than the traditional Luminol mixture.

Experiments C, D, and E all had the same type of reaction which came up quicker and lasted longer to BLUESTAR® FORENSIC versus traditional Luminol with experiments C and D actually having the size and shape of the foot and toes that could easily be observed after treatment with BLUESTAR® FORENSIC. A foot size could have easily been determined from this experiment.

Experiment E, the Mexican tile, reacted well to BLUESTAR® FORENSIC and to traditional Luminol; however, the blood placed on experiment E was apparently too diluted with water to yield an actual size of the area of the foot that made the impression.

Amido Black was administered to **experiments D and E** only with no readable ridge detail observed in either experiment, due to the blood being overly diluted with water.

Experiment C, the bath mat, reacted to BLUESTAR® FORENSIC showing footprint size trails in a line from one end of the mat to the other.

Experiment F : The hand prints were observed in their entirety and were measurable as to size of the hands leaving them on the paper.

3.2. About DNA analysis

Blake Goertz observed the experiments and reactions to BLUESTAR® FORENSIC and believed that useable DNA could be extracted from these items after their treatment with BLUESTAR® FORENSIC. However, due to the fact that bovine blood was used in these experiments, no such extraction was attempted.

Additional experiments by Blake Goertz in the laboratory are anticipated as to the extraction and DNA analysis.

3.3. About the tablets

All participants and evaluators felt that the BLUESTAR® FORENSIC tablets, as they are packaged, would be more easily mixed and used by field investigators for the detection of latent bloodstains than would be the traditional Luminol mixture due to the fact that most investigators and crime scene personnel do not have the scientific background to produce the compounds necessary to mix the traditional Luminol.

3.4. About photography

It was also observed that photography of BLUESTAR® FORENSIC would be much simpler for a police agency than photography of the traditional Luminol mixture's reaction because of the greater luminescence of the BLUESTAR® FORENSIC and the fact that total darkness is not necessary to observe the reaction, thereby cutting down film speed and shutter response to the luminescence. Due to the brightness of BLUESTAR® FORENSIC, it was felt that with a small amount of experimentation the reaction could possibly be photographed with night vision equipment and a video camera easily.

Photography was not attempted in these experiments, due to time constraints of the class.