

The Use of Luminol Photography for Bloodstain Pattern Analysis

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by

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The Use of Luminol Photography for Bloodstain Pattern Analysis

Luminol is a chemiluminescent reagent that can be utilized both as a presumptive test for blood as well as a method of chemical enhancement of impressions in blood on various surfaces. It is an excellent search technique for latent bloodstains at crime scenes or those scenes where it is suspected that attempts were made to clean bloodstains from an area. Since luminol is applied by a spraying technique, wide areas can be efficiently searched for blood. The spraying device should be capable of producing a fine mist. Over-spraying with luminol should be avoided. The use of luminol as a means of searching for spatters of blood on clothing is not recommended. It must be remembered that luminol is not specific for blood, and further confirmation of blood species testing and ultimately DNA testing is essential. The Serology Department of the Forensic Science Laboratory of the Netherlands has developed and tested a luminol solution that has a clear and bright chemiluminescent reaction with minimum deterioration of the DNA with a detection limit of 1:50,000, which is adequately sensitive. Luminol is best used in a darkened environment and requires special photographic techniques.

Bluestar™ is a luminol preparation developed by Professor Loic Blum in France that is extremely sensitive and stable and produces a very bright, long-lasting chemiluminescence. It is reported to be DNA-typing compatible. It has been used successfully by Philippe Esperanca, MS of the French Gendarmerie Forensic Laboratory in France, as shown in the images in Figure 11.25 and Figure 11.26, which were taken with a Fugifilm Finepix S1® digital camera.

Photography of the luminol reaction with a 35-mm camera requires a wide open aperture (f -2.8 or f -3.5) at “B” (bulb) setting with an exposure time of at least 40 to 80 sec. Color

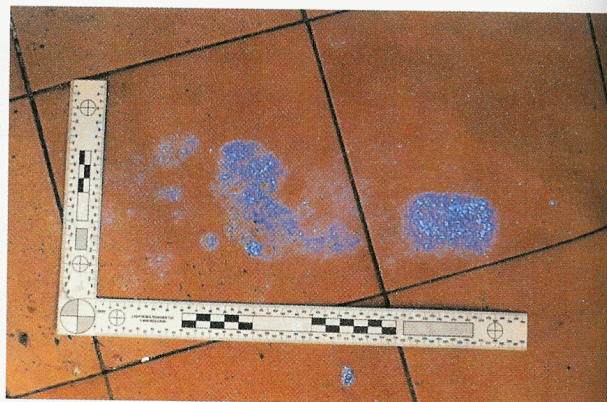


Figure 11.25 Enhancement of latent bloody footprint with Bluestar® luminol reagent and digital camera (30-sec exposure at f -2.8). (Courtesy of Philippe Esperanca, French Gendarmerie Forensic Laboratory.).



Figure 11.26 Enhancement of area of room subjected to prior cleanup of blood with Bluestar® luminol reagent and digital camera (30-sec exposure at f -2.8). (Courtesy of Philippe Esperanca, French Gendarmerie Forensic Laboratory.).

film is preferred over black and white with ASA of at least 200 to 400. The camera must be stationary and fixed to a tripod with a cable release to avoid motion of the camera during filming. It should be set up perpendicular to the surface to be photographed if possible in order to minimize depth of field considerations and optical distortion of the image. Many examiners will photograph the area to be sprayed prior to the application of luminol. Measuring devices that glow in the dark are available for use as a scale in the photograph. Successful results have been demonstrated with the use of a flash during the process. Luminol photography is a two- to three-person procedure. One person sprays the luminol, and the second operates the camera. The third person is available to take notes. Dark clothing and a dark spraying apparatus are advisable to avoid reflection.

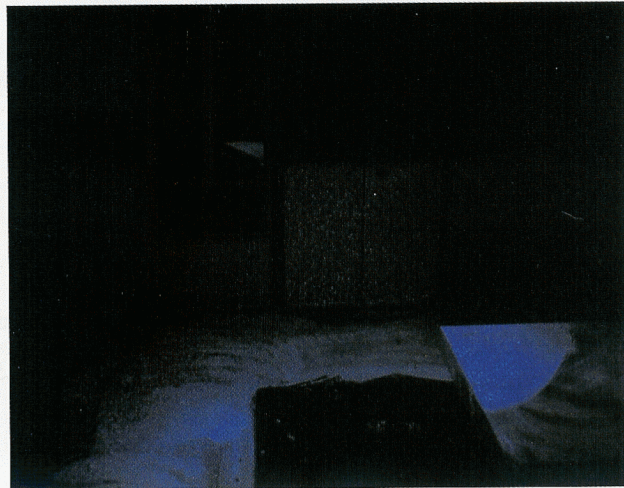
Martin Eversdijk of the Politie LSOP Institute for Criminal Investigation and Crime Science in the Netherlands and other forensic examiners share the opinion that the use of a 35-mm camera with color film is not suitable for luminol photography. A disadvantage of this type of camera is that it is impossible to check the quality of the photograph at the crime scene. A digital camera is a good option. The quality of the photograph can be checked immediately with or without a laptop computer, and new images can easily be taken immediately during the process. Examples of Martin Eversdijk's luminol photography taken with a Nikon COOLPIX® digital camera are shown in Figure 11.27A through Figure 11.27C.

Absence of Evidence Is Not Evidence of Absence

In many cases, the presence of bloodstains originating from the victim and found on the clothing or person of a suspect is powerful evidence to link the suspect to the violent act. It must be pointed out that the absence of blood spatter on a suspect or his clothing does not



A



B



C

Figure 11.27 (A) Area of room prior to the application of luminol. (B) Luminol reaction of blood photographed with digital camera (28-sec exposure at $f/2.8$ and camera sensitivity at ISO 1600). (C) Exposure of the luminol reaction described in Figure 11.27B with flash after 27 sec. (Courtesy of Martin Eversdijk of the Politie LSOP Institute for Criminal Investigation and Crime Science in the Netherlands.)