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FORENSIC CHEMILUMINESCENCE EFFECT IN POLISH CRIME SCENE INVESTIGATION PRACTICE AND IT'S IMPLICATIONS IN BLOODSTAIN PATTERN ANALYSIS

KRYMINALISTYCZNY EFEKT CHEMILUMINESCENCJI W POLSKIEJ PRAKTYCE OGŁĘDZIN MIEJSCA ZDARZENIA I JEGO WPŁYW NA ANALIZĘ ŚLADÓW KRWAWYCH

Kacper Choromański

Master of Law, Faculty of Law and Administration, Center for Forensic Science University of Warsaw
Krakowskie Przedmieście 26/28, 00-927 Warsaw, Poland
ORCID: <https://orcid.org/0000-0002-9015-9626>

* *Corresponding author:* e-mail: k.choromanski@wpia.uw.edu.pl; kacperch@poczta.onet.eu

Abstract

The use of luminol to reveal traces of blood has been known to practitioners for many years. Documentation of such activities is no different. Numerous textbooks describe this in great detail. Therefore, are traces of this type often found on the pages of homicide case files? How often do you see photos of that specific blue light indicating that there may be blood in that area? Who in the investigative practice performs this type of work, and what information can be obtained from it. Are police-certified bloodstain specialists the cure for the ills of pretrial investigation? The article takes a closer look at this topic.

Keywords: luminol, crime scene investigation, testimony expert, specjalist, law

Streszczenie

Stosowanie roztworu luminolu, aby ujawnić ślady krwi, jest znane dla praktyków od wielu lat. Nie inaczej jest z dokumentacją tego typu czynności. Liczne podręczniki to opisują bardzo szczegółowo. Czy w związku z tym tego typu ślady są często spotykane na kartach akt spraw o zabójstwa? Jak często można zobaczyć zdjęcia tego specyficznego niebieskiego światła wskazującego, że w tym miejscu może być krew? Kto w praktyce śledczej wykonuje tego typu czynności i jakie informacje można na tej podstawie uzyskać. Czy policyjni certyfikowani specjaliści od plam krwi są lekarstwem na bóleczki postępowania przygotowawczego? Artykuł przybliży tę tematykę.

Słowa kluczowe: luminol, oględziny miejsca zdarzenia, biegły sądowy, specjalista, prawo

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Main outline of the problem and its relation to important scientific and practical issues

Crime scene investigation is crucial to solving a criminal case [1]. However, contrary to the general belief derived from TV shows [2], the process of giving a final judicial conclusion is not so obvious or easy. In addition to an intensive thinking procedure [3], several forensic examinations must be performed to analyze previously collected evidence. Blood is one of the most common traces at homicide scenes [4]. This type of human tissue is highly beneficial from the genetic point of view, as it allows the identification of the person whose blood it is [5]. Stains can be a fascinating object of study for identifying an event and trying to reconstruct it [6]. Sometimes, it can help distinguish a homicide from suicide [7]. They can also be helpful for both regular cases [8] and those still unsolved, called Cold Cases [9]. Interestingly, law enforcement agencies are increasingly interested in cooperating in determining the course of an event with experts in this field [10].

To date, the issue of blood trail analysis has not been addressed in Poland in much detail and comprehensively [11]. The study can become even more complicated when we consider the impact of using chemicals to reveal unseen stains. The ideal solution to this problem should be the accurate design of documentation of scene investigation methodology in this regard. This article aims to show what it looks like in the Polish criminal law system and what implications this may have for the analysis conducted based on disclosed blood.

Analysis of recent studies, legal acts and literature on the subject, which undertake a discussion of the analyzed issues

Bloodstain pattern analysis focuses on the size, shape, localization and distribution of bloodstains [12]. Based on that, experts can determine a way of creating a pattern that helps reconstruct the whole event. The analysis includes bloody traces visible to the naked eye and those enhanced using specialized chemical agents. The luminol solution is one of the most popular agents used for this purpose [13]. The substance has been known to the world of forensic science for several decades [14], [15], [16]. It should also be pointed out here that Polish practitioners noticed the possibility of using this substance in forensic investigations and practised it, documenting it with their articles [17], [18], [19]. In addition to the typical traces that could be diluted, scientists showed the possibility of revealing stains even under paint [20], [21]. The forensic effect of chemiluminescence is that a luminol solution in an alkaline environment with an oxidant reacts with hemoglobin in the blood, producing visible blue light. The method

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should be used only as a preliminary test [13]. After that each possible blood sample should be confirmed by further genetic laboratories [7].

Although luminol has been known to polish practitioners for years, it is rarely used in Poland. Of course, numerous studies, books and guidelines indicate how it should be implemented during crime scene investigation by the police, but the evidence clearly shows that this way of revealing the trace of blood rarely exists. Scientists unequivocally point out that there are studies describing in great detail how to objectively document and photograph the specific blue glow coming from the reaction of revealing blood traces [22], [23], [24], [25] but such photos are sadly rare. The question occurs: whether the method should be used by a technician, who is a specialist in the sense of Polish Criminal Law [26], or by the testimony expert? Given the current practice of polish bloodstain pattern analysis, one might be tempted to say a certified BPA technician carries out that bloodstain disclosure. Unfortunately, this harms the seriousness of criminal proceedings, as will be demonstrated below.

Aims of paper. Methods

The author hopes this article will discuss using the forensic chemiluminescence effect during crime scene investigation, especially in Poland. This article will synthesise knowledge and information published about luminol's enhanced bloodstains in polish practice and its impact on bloodstain pattern analysis. The principal methodology that the author used for this paper is extensive query among judicial, medical and also legal sources. Also, taking an example that occurs during the author's ten years of forensic experience will be noted and explained. Part of this article will focus on presenting basic rules in polish criminal law that covers crime scene investigation and bloodstain pattern analysis. In the end, the text will be a fundament for further articles that will focus on the new methodology of bloodstain patterns enhanced by the chemiluminescence method on the crime scene, that can distinguish washed stains from stains created passively.

The author hopes that this article will be a spark for further development, studies and research. The work that should be done to improve polish investigation practice.

Exposition of main material of research with complete substantiation of obtained scientific results. Discussion

Although luminol has been present in the forensic consciousness for years, even introductory interview [27] with certified technicians indicate gaps in understanding how this substance works. The following statements evidence this:

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- "The most important is the light that excites the phenomenon of chemiluminescence." This excerpt unambiguously indicates that the certified technician talking to the journalist does not understand where the light seen from the reaction of the luminol solution comes from. He claims that light excites this reaction, which is false information. - "Chemicals are used for this, such as luminol and BlueStar."

BlueStar is a commercial version of luminol. There is no principle to distinguish this. Another document [28], this time of the police unit, describes the scope of work of certified bloodstain specialists. Unfortunately, a typical error that can often be observed in the Polish literature is visible there. This document indicates that technicians can intensify latent traces of blood. The word latent, unfortunately, carries serious implications, and it should be written about invisible bloodstains because it is objective. The deficiencies evident in such statements only highlight the serious problem facing the police. In addition to enhancing stains, certified bloodstain specialists can determine how individual bloodstains were created and write a report about it. This is an absolute misunderstanding. The literature clearly indicates that the technician secures the forensic evidence and should not analyze it [29]. That is what a qualified expert is for, not a specialist. It's a bit like a technician securing a fingerprint trace and at the scene trying to make a forensic identification of this trace, i.e. make a detailed analysis of it. What's more, this type of specialist, in creating his report, is based on a methodology that has not been published anywhere. This is given expression in the passage [27]: - "Currently in force are the 2021 guidelines of the Central Forensic Laboratory of the Police, which concern the conduct of activities from the speciality of "Bloodstain Analysis." I would add that the first document in this regard was already created in 2018. "

Up to now, forensic methodologies, whether at the scene or in the laboratory, have been published to go through scientific criticism and possible corrections [30], [31], [32]. In the case of bloodstain pattern analysis, there wasn't any publication, which in my opinion, reflects negatively on the document. How can there be any kind of certification [33] or standard in such a case? Interestingly, there is already published Polish terminology for bloodstain pattern analysis [12], and even a process of its creation has been described [34]. Polish scientists use it [35], unlike police technicians. Thus, it can easily be pointed out that many of the algorithms for police conduct during the investigation of a crime scene are based on intuition rather than a previously developed detailed research methodology [36].

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Unfortunately, the report on the bloodstain pattern analysis prepared by the technician has no evidentiary significance under Polish law. It is not evidenced within the meaning of the Polish Criminal Code, and it is only information. The report is not verified for accuracy by an expert. Certified technicians do not note the lack of evidentiary significance. In the interview cited earlier [27], the interviewee states:

-Mainly, this is what the work of a certified specialist is based on, the determination of the mechanism. At the stage of conducting the visual inspection, before the appointment of an expert, one can already get a preliminary view of the situation that may have occurred. This can be regarded as a preliminary opinion.

This is patently untrue. There is no institution of a preliminary opinion in the Polish trial. In addition, as was mentioned earlier [29], the role of the specialist is not analysis but documentation.

Based on the information from the technician, the authority may designate samples for genetic testing, but this can artificially generate costs, mainly if the report contains errors. Researchers point out that the financial issue of handling criminal cases is becoming increasingly important for state bodies [37], [38], [39]. The designation of traces that may be important for reconstructing an event is called their prioritization. The topic is relatively broad, so it will be described in another paper. However, one more critical factor is worth mentioning here. Well, prioritization involves the selection of samples whose genetic identification will allow us to obtain meaningful information regarding the reconstruction of the event. Prioritization is performed, taking into account all the evidence collected at the crime scene. In the interview cited earlier [27], a certified specialist says:

- technicians would have to secure everything, so the certified specialist knows what area to focus on, which reduces the time of activities, and it is known that the time of activities is also essential when apprehending perpetrators.

In this case, in my opinion, as many traces as possible should be collected because if we do not collect them, they will be lost. Limiting the collection of samples does not reduce the process's economy because the cost of collecting swabs is low. Genetic testing generates the costs, and at this stage, we need to prioritize the traces, not at the scene.

Using luminol in polish crime scene investigation practice

Within the framework of the conducted grant, The new methodology of bloodstain patterns enhanced by the chemiluminescence method on the crime scene, that can distinguish washed stains from stains created passively, an analysis of homicide files from the years 2000-2020 in the Ostrołęka District Court and the Płock District Court was

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carried out. Out of a total of 183 homicide cases, forensic chemiluminescence was used in only two. Even though there was speculation that the blood had been washed off in many cases. In the first case, it was carried out by a genetics expert at the scene. In the second, it was applied by a forensic technician in the trunk of a car. In many other cases, traces of blood could be seen at the scene, but they were not properly reinforced. Through this behavior, it was impossible to develop good material for a detailed reconstruction of the event. A more detailed description of the file analyses will be presented in subsequent publications soon.

In two situations from the examination of the files and from more than a dozen cases in which the author gave an opinion when there was the application of luminol, the protocol of the scene did not contain such vital data as the time of preparation of the mixture, documentation of its practice, making zero tests, no description of the device with which the spraying was done, there was no description of who sprayed, there were low-quality photos. In some cases, instead of pictures of shining, there was a chalk mark where it was supposed to shine, smearing the trace. Much of the necessary information for the expert was missing, making it impossible to make an appropriate inference. Despite having interesting technologies [40], scientists are still challenged to implement basic methods of applying and documenting chemiluminescence at the scene.

Conclusions

For the time being, forensic technology specialists prepare reports and uncover tie marks using chemiluminescence. The methodology based on which they work is an internal document and has never been subjected to typical scientific verification. This fact alone is outrageous enough and causes severe defects regarding the quality of the work of certified specialists. The quality of the visual inspections conducted from this angle is also in question. Instead of creating dozens of pages of text in the protocol, which will be of no use to the expert, it is possible to take high-quality photos and describe in the protocol only the most critical issues that evade the image. Practitioners still have a long way to go before the needed change in the documentation of the scene, especially blood traces, will be efficient and helpful for establishing the course of the event.

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