A26 Development of Aged Latent Prints: How Old Is Too Old?

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After attending this presentation, attendees will understand the problems involved with the enhancement of aged latent prints on porous surfaces.

This presentation will impact the forensic science community by serving as a demonstration of the ability of DFO, ninhydrin, and 1, 2- indanedione to develop aged latent prints on porous surfaces.

Three of the current and most widely used chemical formulations for the development of latent prints will be discussed, as well as their application to the development of aged latent prints. Statistical data from this research will show the effectiveness of 1, 8-diazafluoren-9-one (DFO), ninhydrin, and 1, 2-indanedione formulations on the development of latent prints ranging in age from less than one year to twenty one years old. Ninhydrin is a chemical reagent that reacts with the amino acids in the latent print residue to form a purple coloration along the friction ridges of the latent print, known as Ruhemann's purple. Ninhydrin is one of the more common chemical processes used for the development of latent prints on paper. Developed from a ninhydrin analog, DFO reacts in much the same manner as ninhydrin, responding to the amino acids present in the latent print residue. However, DFO produces a light pink coloration along the friction ridges that is only slightly visible to the naked eye. When examined under an alternate light source of 470 to 570 nm and with an orange filter, the details of the latent print fluoresce, becoming much more visible. With further research into ninhydrin analogs, 1, 2-indanedione was discovered as a latent print development technique. 1, 2-indanedione also reacts with the amino acids in the latent print residue, and like DFO, the developed latent print is barely visible to the naked eye, but fluoresces when viewed under an alternate light source with an orange filter. However, research has shown that 1, 2-indanedione has a higher sensitivity to the amino acids in the latent print residue, allowing for a higher frequency of enhanced latent prints. This study examined whether the advantage of using 1,2-indanedione's sensitivity could be exploited to detect latent prints on "aged" documents. The envelopes were handled in the mailing process and at the time of receipt were then stored in a light tight container until the time of chemical processing for this study. The envelopes were processed using the DFO, ninhydrin, and 1, 2-indanedione methods. The latent prints that developed using all three processes were given the following score: (1) no ridge detail developed; (2) few ridge details developed; (3) comparable ridge detail developed; and, (4) AFIS quality ridge detail developed. The DFO processed envelopes produced positive results on 35% of the twenty envelopes processed with 10% of those being considered identifiable. The ninhydrin processed envelopes produced positive results on 40% of the twenty envelopes processed with 15% of those being considered identifiable. The 1, 2-indanedione processed envelopes produced positive results on 95% of the twenty envelopes processed with 85% of those being considered identifiable. This data was analyzed by Chi Square test and these differences were statistically significant with 1,2-indanedione having a higher identification rate then either DFO or Ninhydrin, over the age range tested. There was no difference in the ability to detect latents in the "older" (16-19 yrs, N=20 latent prints; 11-14 yrs, N=58) and the "younger" latents (< four-years old, N=22), p value =.167. In criminal investigations, the development of latent prints often lead to evidence that will provide substantiation of an individual's involvement in a crime. With the passage of time, the degradation of the latent print residues reduces the probability of developing identifiable latent prints on evidentiary items. It can be concluded that the degradation of the amino acids within the latent print residue was not too significant to allow for a reaction with the chosen chemical processes. 1, 2-indanedione showed to be the best process to use for developing aged latent prints on paper, producing the highest quantity and quality enhanced latent prints.

Aged Latent Prints, Porous Surfaces, Chemical Development

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