



### **B149 Comparison of Methods for Developing Submerged Fingerprints**

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**Learning Overview:** Learning Objective: After attending this presentation, attendees will learn the factors affecting the method selected for developing fingerprints that have been immersed in water.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by providing a comparison of methods for developing fingerprints on non-porous materials and immersed in water. Variables discussed include print deposition before or after immersion, glass or aluminum substrate, and length of immersion.

Fingerprints found at crime scenes are valuable evidence for identification. The composition of latent fingerprints includes both eccrine and sebaceous secretions, which are targeted by physical or chemical methods to visualize the prints. The method for developing latent fingerprints is selected based on the composition of the fingerprint residues, the surface, and the environment.

Evidence exposed to wet environment may be neglected, while previous studies have proven that fingerprints on non-porous substrates and immersed in water for up to fifteen days can be developed successfully by small particle reagent (SPR). Specifically, SPR was found to performed well on plastic and aluminum foils. Another well-known method for developing prints on non-porous surfaces is cyanoacrylate fuming. Both SPR and cyanoacrylate fuming methods have shown promise for developing identifiable prints on surfaces recovered from wet environment. A new method, Oil Red O has recently been proposed for the development of fingerprints on wet surfaces. Oil Red O is a lipophilic dye that binds to the sebaceous residues in a fingerprint and stains the print pink.

In this project, Oil Red O was compared to SPR (Sirchie SPR100) and cyanoacrylate fuming on fingerprints deposited on glass slides and aluminum foils. Since fingerprints at crime scenes can be left on wet surfaces or made under water, the experimental prints were deposited both before and after the substrates were submerged. The substrates were immersed in distilled water for 1, 3, or 7 days. After development, the minutiae are marked by using AFIX software. The quality of the developed prints is reported as the percentage of minutiae present in the experimental print compared to the number in the reference print.

Initial results indicate that SPR produces the best results for fingerprints submerged for seven and three days, though the quality is lower than that of the control print. Moreover, the performance of the SPR is not influenced by whether the prints were deposited before or after submersion. The prints submerged for seven days are visible after the development of cyanoacrylate fuming and Oil Red O solution, but the prints fail to be lifted and preserved for identification. However, the prints made under water which were immersed for three days can be developed by cyanoacrylate fuming and Oil Red O solution. To date, the less time samples are in contact with water, the more effective the methods are for developing the print.

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#### **Wet Fingerprints, Small Particles Reagent, Oil Red O**