A139 Phenolphthalein False-Positives: What's Buried in Your Garden?

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After attending this presentation, attendees will be familiar with several common garden plants which consistently yield false-positives when screened using phenolphthalein as a presumptive test for the presence of blood.

This presentation will impact the forensic science community by alerting investigators of materials and conditions which can produce misleading results when screening evidence for blood. This presentation

will assist attendees in recognizing which plants yield phenolphthalein false-positives and alternative testing methods to prevent mis- identification.

The presence of bloodstains on items of evidence is often critical to how a criminal investigation proceeds. A positive presumptive test for blood is a determining factor of how an item of evidence is prioritized and can even be decisive as to whether or not the evidence is further analyzed. Presumptive testing is typically performed using one or more colorimetric tests as a screening tool. These tests are inexpensive and rapid, allowing screening of potential bloodstains even while at a crime-scene. One very commonly used test is the Kastle-Meyer test, which is based on the catalytic activity of the heme group on hemoglobin. This test is often referred to as the "phenolphthalein test," as it involves the oxidation of reduced the phenolphthalein substrate to produce a rapid color change after the addition of hydrogen peroxide. DNA profiles extracted from phenolphthalein-positive stains are presumed to be from the blood on the evidence.

While certain substrates have previously been shown to occasionally yield false-positive reactions, this presentation describes a previously unreported class of plants, including *Pisum sativum*, which consistently yields phenolphthalein false-positive reactions. The particular plant tissue further mimics true aged bloodstains by causing brown or red- brown staining on cloth, swabs, and other materials. Longitudinal studies have demonstrated that these stains retain their phenolphthalein false- positive reactivity after three years. Similarly, plant tissue which has been frozen for three years after harvesting continues to demonstrate the phenolphthalein false-positive reactivity which is indistinguishable from true bloodstains both in color quality and developmental time-frame.

The widespread prevalence of these plants in gardens across the United States adds to the deleterious potential for mis-interpretation of phenolphthalein testing results when screening evidence which has been in contact with these common plants. A proposed mechanism accounting for the false-positive reaction will be presented. This information can serve to further identify which plants are prone to yield phenolphthalein false-positive reactions.

Bloodstain, Phenolphthalein, Hemoglobin

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