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## Forensic Chemical Analysis of Lipstick

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Poster Presentation 11

FORENSIC CHEMICAL ANALYSIS OF LIPSTICK

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In the ongoing battle on crime, law enforcement officials are routinely presented with many different types of evidence at crime scenes. Evidence such as blood stains and pieces of clothing are of obvious benefits to investigators as they link subjects to crimes. But many crimes go unsolved due to lack of evidence at the scene or evidence that, due to lack of technology, is useless. Recent advances in technology and improved analytical methods have allowed scientists to begin to use evidence previously thought to be useless such as cosmetic smears. A basic analysis of major organic and inorganic constituents of cosmetic smears allow for classification of a smear as a particular product - lipstick, eyeliner, rouge, etc. For example, if upon analysis of a smear, castor oil and wax were found to be the major constituents then the smear would be classified as lipstick. Further, more in-depth chemical analysis of said cosmetics provide a link between victim, perpetrator, and crime scene and can ultimately serve as circumstantial evidence in court.

Lipstick residue and smears are the most often encountered cosmetic smears at crime scenes and therefore our research centers around analysis of the major constituents of lipstick. There is no existing national database through which lipstick can be compared and associated to one manufacturer. Therefore, it is necessary to seek similarities in composition and color between lipstick at a crime scene and lipstick found in the possession of a suspect. Composed of three major components - castor oil, wax, and dyes - lipstick has been analyzed through a series of extractions. Through extractions, the major components of many different lipsticks were drawn out for comparative purposes. Comparisons of different lipsticks were performed based on three different groupings:

1. 5 lipsticks of differing colors made from the same manufacturer to determine consistency of components from one manufacturer.
2. 7 lipsticks of similar color made from 7 different manufacturers to determine consistency of components between manufacturers.
3. 3 lipsticks of similar color and made from the same manufacturer but sectioned into pieces to determine consistency of components within one stick of lipstick.

The results of these comparisons will be presented.