Criminalistics 2

Evaluation of the Degradation of Lotion Components Due to Age and Exposure

Mr. Jeffrey Dake, DFSC-USACIL, United States; Dr. Edward Sisco

Abstract: After attending this presentation, attendees will have a broad understanding of the forensically significant chemicals which comprise commercial lotions, and how the compositions of the lotions can vary due to age and exposure.

This presentation will provide attendees with the knowledge base to examine and compare commercial lotions with residues collected from crime scenes, clothing, and other evidence. An evaluation of the variability between commercial lotions will be explored, as well as the effects of age and exposure on the chemical constituents of lotions, thus providing attendees with the knowledge to effectively interpret analytical results. This will assist in mitigating and minimizing errors associated with misinterpretation of evidence and data. The results of this project will also assist with providing scientific underpinnings for lotion analysis methods and providing more accurate statistical interpretation of data.

Commercial lotions are virtually ubiquitous in modern society. Lotions and their residues may be encountered in forensic casework in a variety of fashions; by the transfer to items of evidence through contact in assaults, theft, breaking and entering, and sexual crimes

In this study a sample set of over 100 commercial lotion products was analyzed to assess the degree of variation between different products. The results of these analyses can provide numerous data points from which a comparison to a known source or questioned sample may be made.

Factors such as the presence/absence of certain chemical constituents, the relative concentrations of various components, and the frequency of occurrence of the chemical components were evaluated. The frequency of occurrence was evaluated to determine the most discriminating components in lotion samples, and principal component analysis was performed to assess the discriminatory value of the components detected in lotion samples.

Inter-lot and Intra-lot variability was also assessed. Several samples of the same product line, but of different lots, were collected and analyzed from several different manufacturers. Duplicates of each lot sample were also analyzed. Some minor variation was observed between different lots of the same product, which may be due to variations in raw materials or manufacturing location.

Finally, the effects of aging and exposure were evaluated on the lotion samples from the inter/intra-lot variability examination. Noticeable changes in the composition were detected, particularly in the presence and concentration of light weight volatile compounds. An evaluation of the constituents which were lost due to evaporation and exposure will be discussed, providing valuable insight which can be utilized for data interpretation and sample characterization in the performance of forensic casework.

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