Contribution ID: **198** Type: **Oral**

Comparative study of Automobile Paint using FTIR and chemometrics _ A Review

Abstract
This study aims to examine the automobile paint evidence analysis, which is crucial in forensic science, especially in vehicle accident cases. The binder, a fluid or polymeric component, provides adherence to the paint, ensuring the coating retains pigments and additives. Pigments, either inorganic or organic, provide color and corrosion resistance. Solvents are essential in paint to ensure a liquid state for easy application. Small amounts of additives are added to paints to enhance performance qualities. Thickeners, surfactants, and driers function as catalysts. A Fourier Transform InfraRed (FTIR) Spectrometer acquires broadband Near Infrared (NIR) to Far Infrared (FIR) spectra, converting the interferogram into an IR spectrum. FTIR spectroscopy and chemometric techniques have become powerful tools for comparing and evaluating paint evidence from automobiles. FTIR spectroscopy provides information about the molecular structure of a sample and can identify paint components, distinguish between samples, and differentiate between them based on unique spectral signatures. Chemometric techniques, such as multivariate analysis, can analyses and interpret the complex data generated by FTIR spectroscopy, enhancing spectral resolution and allowing for more accurate identification of paint components.

Keywords: Automobile paint, FTIR, Chemometrics, Road traffic accident, Hit-and-run cases

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Track Classification: Forensic Sciences